STATE OF MICHIGAN
DEPARTMENT OF ENVIRONMENTAL QUALITY
LANSING

JENNIFER M. GRANHOLM
GOVERNOR

STEVEN E. CHESTER
DIRECTOR

April 13, 2006

Mr. Ben Baker
Senior Environmental Project Leader
Michigan Operations
The Dow Chemical Company
47 Building
Midland, Michigan 48667

Dear Mr. Baker:

SUBJECT: Response to Comments and Notice of Deficiency (NOD); Tittabawassee River and Floodplain Remedial Investigation Work Plan (TR RIWP) and Midland Area Soils Remedial Investigation Work Plan (Midland RIWP); The Dow Chemical Company, Michigan Operations (Dow); MID 000 724 724

In follow up to the initial NOD that was sent to you by the Michigan Department of Environmental Quality (MDEQ), Waste and Hazardous Materials Division (WHMD), on March 2, 2006, identifying the "high level" deficiencies found during a review of the TR and Midland RIWPs, which were submitted on December 29, 2005, this NOD transmits the additional comments referenced in the initial NOD. As you are aware, the MDEQ accepted comments from the public and the Natural Resources Damage Assessment (NRDA) Trustees through March 15, 2006. The MDEQ had indicated that after the close of this comment period you would be provided additional, more detailed comments on the RIWPs including, but not limited to, the proposed Midland and Tittabawassee bioavailability studies, the ecological risk assessment components of the RIWPs, and the public participation components of the RIWPs.

Attachment 1 contains additional, more detailed technical review comments made by the WHMD, exclusive of the comments that were received from the public and the NRDA Trustees.

Attachment 2 contains the NRDA Trustees' comments and the MDEQ's responses/deficiencies on the TR and Midland RIWPs.

Attachment 3 contains the public comments received and the MDEQ's responses/deficiencies on the TR RIWP.

Attachment 4 contains the comments received from the city of Midland and the public on the Midland RIWP and the MDEQ's responses/deficiencies on the Midland RIWP.

As was indicated in the initial NOD, we continue to believe it is appropriate and necessary to focus on revising the initial phases of the RIWP to address the field work that can be conducted yet this year. To that end, staff of the MDEQ and

U.S. Environmental Protection Agency (U.S. EPA) are available to meet with Dow and its contractors on April 12 and 18, 2006, to discuss the sampling work plan revisions necessary to ensure that Tittabawassee River and floodplain and Midland soils sampling proceeds this summer. Additional dates can be arranged, as needed. Dow and Ann Arbor Technical Services, Inc., will need to work closely with the MDEQ over the next month to determine whether/how the *GeoMorph* process can be used to address contaminated Tittabawassee River sediments in a timely manner.

Pursuant to Condition XI.F.2. of Dow's hazardous waste management facility operating license, Dow has 60 days from the receipt of the March 2, 2006, NOD to modify and resubmit the portions of the RIWPs related to addressing the field work that can be conducted yet this year. As indicated in the letter to Ms. Susan Carrington from Mr. Jim Sygo dated April 10, 2006, Dow is to address NOD comments 1 through 7, 9, 11, and 16 and is to revise the Midland potential constituents of interest (PCOI) investigation strategy to address NOD comment 10 by May 1, 2006. Related comments that are also to be addressed by May 1, 2006, are denoted by inclusion of the May 1, 2006, due date in brackets after the deficiency in Attachments 1 through 4 to this NOD.

Deficiencies not related specifically to field work to be conducted this summer are denoted by inclusion of the December 1, 2006, due date in brackets after the deficiency in Attachments 1 though 4 to this NOD. These deficiencies are to be addressed on the same schedule as comments 8, 12 through 15, and 17 through 26 of the March 2, 2006, NOD, as stated in the above-referenced letter to Ms. Carrington dated April 10, 2006. Pursuant to Condition XI.O. of Dow's hazardous waste management facility operating license, an alternate schedule for submitting required corrective action documents in accordance with the schedule may be approved in writing by the WHMD.

Additionally, in response to Dow's April 10, 2006, letter to Mr. Sygo, the WHMD wishes to clarify that the revisions identified for the TR RIWP, as described in the fourth bullet of the second paragraph of page 2, should include potential sampling of Priority 1 properties, in addition to Priority 2 properties, if representative sampling cannot be accomplished on only Priority 2 properties.

Should you have questions regarding this NOD, please contact Mr. Allan Taylor, Hazardous Waste Section, WHMD, at 517-335-4799 or by e-mail at taylorab@michigan.gov, or you may contact me.

Sincerely,

George W. Bruchmann, Chief
Waste and Hazardous Materials Division
517-373-9523

Attachments

cc/att: Ms. Susan Carrington, Dow
Mr. Peter Wright, Dow
Mr. Jack Clough, Clough Consulting
Mr. Jack Bails, Public Sector Consultants
Ms. Lauri Gorton, CH2M Hill
Mr. Tom Long, The Sapphire Group
Ms. Margaret Guerriero, U.S. EPA, Region 5
Mr. Gerald Phillips, U.S. EPA, Region 5
Mr. John Steketee, U.S. EPA, Region 5
Mr. Greg Rudloff, U.S. EPA, Region 5
Mr. Jim Sygo, Deputy Director, MDEQ
Mr. Frank Ruswick, Jr., Special Assistant to the Director, MDEQ
Ms. Liane Shekter Smith, MDEQ
Mr. Steve Buda, MDEQ
Ms. De Montgomery, MDEQ
Dr. Deb MacKenzie-Taylor, MDEQ
Ms. Cheryl Howe, MDEQ
Mr. Allan Taylor, MDEQ
Corrective Action File

ATTACHMENT 1

Michigan Department of Environmental Quality (MDEQ) Technical Review Comments/ Notice of Deficiency on The Dow Chemical Company (Dow) Tittabawassee River and Floodplain Remedial Investigation Work Plan (TR RIWP) and Midland Remedial Investigation Work Plan (Midland RIWP)

April 13, 2006

The "[5/1/06]" at the end of the MDEQ's response means this deficiency is to be addressed in the submittal due on May 1, 2006. The "[12/1/06]" at the end of the MDEQ's response means this deficiency is to be addressed in the submittal due on December 1, 2006.

1. In order to help identify contaminant sources and develop an appropriate Potential Constituents of Interest list, the TR RIWP and Midland RIWP must be revised to state whether wastewaters from the Sludge Dewatering Facility (SDF) were discharged to the Tittabawassee River. If such discharge occurred, the revisions must contain a description of the SDF, including the period of operation, materials that were disposed, and the fate of the wastewaters from the facility so this information can be taken into consideration in determining the physical nature of the river contaminants (e.g., colloidal fraction when sampling). [12/1/06]

2. The TR RIWP and Midland RIWP must include the congener-specific results for each of the dioxin and furan samples that Dow collected in studies completed prior to the submission of the RIWPs. This data must be submitted in electronic and hard copy format. [5/1/06]

3. The TR RIWP and Midland RIWP must be revised to include a mechanism to compare the dioxin analytical results between the different laboratories that Dow is using for the corrective action related investigations. For example, samples collected by Michigan State University for biouptake studies need to be compared to samples analyzed by Dow's laboratories to ensure comparability. [5/1/06]

4. The TR RIWP must be revised to include a plan to further determine the extent of wild game contamination. Other local game species need to be assayed to determine levels of contamination, if any. In addition, the ranges of the deer and turkey that have already been determined to be impacted must be better defined. [12/1/06]

5. If Dow continues to pursue the TR RIWP bioavailability sampling program, it must be revised to clarify the technical basis for the proposal. It is recommended that Dow work with the MDEQ to revise the TR RIWP bioavailability sampling program in conjunction with the proposed Midland Bioavailability Study sampling program. [5/1/06]

ATTACHMENT 2

Natural Resources Damage Assessment (NRDA) Trustees' Comments and Michigan Department of Environmental Quality (MDEQ) Responses/Notice of Deficiency (NOD) on The Dow Chemical Company (Dow) Tittabawassee River Floodplain Work Plan (TR RIWP) and Midland Remedial Investigation Work Plan (Midland RIWP)

April 13, 2006

The NRDA Trustees' comments are shown in *italic font*. The MDEQ's responses to comments/deficiencies are shown in **bold font**. The "[5/1/06]" at the end of the MDEQ's response means this deficiency is to be addressed in the submittal due on May 1, 2006. The "[12/1/06]" at the end of the MDEQ's response means this deficiency is to be addressed in the submittal due on December 1, 2006. No date in brackets following the MDEQ's response denotes public comments/other information that is to be taken into account by Dow in revising the TR RIWP and/or Midland RIWP.

1. *Our [the Trustee Council][1] comments here address types of data collection or analyses already generally contemplated in the RIWP that might also be useful in an NRDA context, though we have not yet developed an Assessment Plan and cannot say with any certainty what the precise data needs are for the NRDA.*

As more precise data needs for the NRDA are identified, they should be communicated by the Trustees to Dow through the MDEQ or the alternative dispute resolution mediation, as appropriate.

2. *Potential Contaminants of Interest (PCOI) Identification*

   Contaminants previously detected in biota (e.g., caged fish) need to be included in the PCOI list. Compounds which exhibit Ah-receptor-mediated toxicity should be included in the PCOI list in order to develop accurate risk and injury assessments for dioxin-like compounds. Compounds to be considered for inclusion in the PCOI list should include the relevant chlorinated and brominated isomers of biphenyls, biphenylenes, naphthalenes, diphenyl ethers, dibenzothiophenes, and azo/azoxy benzenes.

The MDEQ agrees that this must be submitted as part of the sampling plan to be provided by May 1, 2006, and provides the following supporting comments. Contaminants previously detected in biota (e.g., caged fish) must be included in the PCOI list, unless an appropriate justification is provided for excluding them. In addition, reconnaissance sampling must be conducted to determine if the PCOIs identified by the Trustees need to be added to the target analyte list for the remedial investigation. As discussed previously with Dow and the Trustees, the MDEQ believes that one way to determine if there are additional PCOIs that are bioaccumulative in nature would be to collect samples of older carp and catfish for extended chemical analysis – including the conduct of a library search for tentatively identified compounds. If present in the fish, then the compounds would be added to the target analyte list for further investigation. Some limited screening sampling has been conducted by the MDEQ on sediment and floodplain soils for polychlorinated naphthalenes and brominated

[1] The Trustee Council includes representatives from the U.S. Department of the Interior (U.S. Fish and Wildlife Service and the Bureau of Indian Affairs), the Saginaw Chippewa Tribe, and the State of Michigan (MDEQ, Michigan Department of Natural Resources, and the Michigan Attorney General).

dioxins and furans. This data has recently become available and is available for Dow and the Trustees to review. [5/1/06]

3. *Geospatial Modelling; Sediment and Soil Sampling*

In general, the Trustees support sediment and floodplain soil sampling designs that are based on geomorphological features (e.g., erosional areas, specific depositional layers, levees, splays). Understanding the relationships between contaminant concentrations and geomorphological features should improve our ability to evaluate remedial and restoration alternatives. To use this approach, the statistical design must consider the sampling density required to fully characterize a given geomorphological feature given the measured variability of concentrations within that feature. Soil and sediment cores should be subdivided for contaminants analysis based on the layers distinguishable in the core by characteristics such as grain size, color, cohesiveness, and organic content. These characteristics should be noted for every sample. Physical and chemical parameters that help us understand both contaminant mobility/availability and the stability and source of the sediment and floodplain soil layers themselves need to be measured. In looking toward remedial feasibility, structural aspects of the sediments and soils should also be measured.

The MDEQ agrees with these comments which are consistent with, and supportive of, deficiencies provided by the MDEQ in the March 2, 2006, NOD. These comments must be addressed by Dow in response to this NOD and the March 2, 2006, NOD. [5/1/06]

The Trustees need to assess injuries and damages over both time and space. The number and locations of soil and sediment samples proposed in the RIWP do not appear to be adequate to fully characterize the spatial extent of contamination for the Trustee's purposes. If a phased approach to sampling is intended, this needs to be described in more detail. Soil and sediment cores need to be dated so that we know what the concentrations were to which biota were exposed in the past.

The MDEQ agrees that this is necessary information for the NRDA and that this is an area where additional data collection could be cost-effectively conducted as part of the remedial investigation to support the NRDA data needs. It is the MDEQ's understanding that Dow has archived the cores so future dioxin and furan analyses could be conducted.

4. *Geographic Extent of Investigations – River Corridors*

For many types of biological sampling and evaluation, year-to-year variability in levels of contamination, productivity, and other physiological endpoints is known to be significant. At this point, the Trustees believe that the entire Saginaw River and likely at least the inner part of Saginaw Bay will need to be included in the assessment in addition to the Tittabawassee River. Thus, biological sampling and evaluation that is conducted in the Tittabawassee River corridor and reference areas also should be conducted simultaneously in at least the Saginaw River corridor so that the extent of any impacts that might be observed can be determined under as similar conditions (and observers) as possible. The links between any impacts and sources of contaminants will need to be evaluated, so co-located soils, sediments, and dietary items should be collected for analysis simultaneously with the biological samples. These samples should be analyzed for PCDD/F [polychlorinated dibenzo-p-dioxins and furans] *congeners as well as other compounds that could contribute to the observed impacts in order to elucidate source contributions.*

With respect to concurrent biologic sampling and evaluation along the Saginaw River and Bay, the MDEQ agrees that this is necessary information for the NRDA and this is an area where additional data collection could be conducted as part of the remedial investigation to support the NRDA data needs. Dow is not required by its operating license to begin these types of evaluations until 2007. However, this is an area where Dow could choose to begin collecting additional data concurrently with work being conducted on the Tittabawassee River to support the NRDA process and to begin addressing Saginaw River and Bay remedial investigation needs. Note that this would require the development and prior approval of work plans by the Trustees and the MDEQ.

5. *Geographic Extent of Investigations – Midland Area*

Section 6 (Ecological Risk Assessment) of Dow's RIWP for the Midland Area states that habitats, receptors and pathways present in the Midland area will be evaluated in the RI and that the results of the ecological risk assessment (ERA) being performed for the Tittabawassee River and floodplain will be applied to those identified receptors and pathways. The source of PCDD/Fs in the Midland Area is aerial deposition whereas the source of the PCDD/Fs in the river corridor is release and re-releases in the aquatic environment. Because of this, the patterns of congeners to which biota are exposed are different in the two areas. The modeled risk from different patterns of congeners can be addressed with the use of toxic equivalency factors (TEFs), to the extent that the TEFs are accurate and the assumption of additivity is met, but results from field assessments and bioassays may not be directly transferable from the river corridor to the Midland area.

The MDEQ agrees with this comment which is applicable to the Midland RIWP. The Midland RIWP must be revised to address this comment. [12/1/06]

6. *Ecological Receptors*

The Baseline Ecological Risk Assessment Work Plan (BERA WP) lists the ecological receptors that will be the focus of both the BERA and the continuing field impact studies being conducted by Michigan State University (MSU). This list appropriately includes some species known to be sensitive to PCDD/Fs (e.g., mink), some expected to be highly exposed because of their position in the food web (e.g., great horned owl, great blue heron) and some because they represent specific feeding guilds. Some appear to have been selected because they are abundant and easy to work with in the field (e.g., tree swallow, house wren). These species may be representative of species that are generally more tolerant to stressors than other species. The Trustees will need to consider the entire range of species that could have been or are being injured, so the species being studied will likely need to be placed in the context of a wider range of sensitivities and exposures.

Additional species could be assessed now in order to reduce uncertainty in the Trustee's assessments in the future. The MSU team collected eggs from wood duck boxes placed along the Tittabawassee River both upstream and downstream of Midland. Since preliminary data from the Trustees' study indicates that hooded mergansers use wood duck boxes and are more highly exposed than wood ducks, hooded merganser eggs collected by the MSU team should be analyzed (e.g., 10 eggs, each from a different box, from both the upstream and downstream portions of the river). The Trustees disagree with Entrix's conclusion that the American woodcock is not a resident on the site based on field observations. Woodcocks are known to breed on the Shiawassee NWR, though they are difficult to find unless trained observers are specifically searching for them. Exposure to woodcocks should be evaluated because of their close association with floodplain soils and their earthworm-dominated diet. A mammalian tertiary

consumer like the red fox or coyote should be included in the BERA. Entrix has argued against their inclusion based on habitat (red fox) and foraging range (coyote), but the Trustees believe that sufficient habitat for red fox exists that they should be evaluated and protected and that an evaluation of the home range size for coyotes can be included in the BERA.

The MDEQ agrees with these comments which are applicable to the TR RIWP ecological risk assessment as well as the NRDA. The TR RIWP must be modified to specifically address these comments and to include the subject species in the BERA. [12/1/06]

The BERA does not include assessment of fully aquatic species. The Trustees will need to consider injuries to fish and benthic invertebrates in our assessment process, and the risk to these groups of biota should be assessed in the BERA to test the assumption that protecting mink will protect the aquatic food web.

The MDEQ agrees with these comments which are applicable to the TR RIWP ecological risk assessment as well as the NRDA. The TR RIWP must be modified to specifically address these comments and to include the subject species in the BERA. [12/1/06]

The Trustees request split samples from a subset of the ecological sampling being performed in support of the BERA. We would be happy to discuss this in more detail with the relevant parties.

The MDEQ agrees with this comment. A mechanism must be developed as part of the BERA to address splitting of samples with the Trustees and/or the MDEQ. [12/1/06]

The Trustees understand the difficulties in selecting and obtaining access to suitable reference areas for ecological field studies, but we have some concerns with the reference sites identified in the RIWP and being used by MSU. The soils and sediments in the reference areas need to be fully characterized and the RIWP includes very few (two?) sampling points in the reference areas. The use of the Pine River as a reference area is confounded by the presence of point sources of other contaminants (e.g., PBB, DDT/DDE, petroleum hydrocarbons) upstream and the uncertainty in the gradient of those contaminants as the Pine River flows into the Tittabawassee, through the impounded area of the Dow dam, and then downstream of Midland.

The MDEQ agrees with these comments which are applicable to the TR RIWP ecological risk assessment as well as the NRDA. The TR RIWP must be modified to specifically address these comments and to include the subject species in the BERA. [12/1/06]

7. *Other Trustee Resources*

Other natural resources that may be of interest to the Trustees as we develop our assessment but that are not being addressed specifically in the RIWP include air, groundwater, drinking water, and cultural resources. The RIWP appears to include only six samples of surface water. The Trustees may include injury to surface water (e.g., exceedances of relevant water quality criteria) in our assessment and the sample size proposed is not sufficient to adequately characterize the potential degree and spatial extent of contamination. A sampling and analysis plan for surface water needs to include sampling under a variety of flow conditions and water temperatures over a broad geographic extent, and the analysis must be capable of achieving relevant limits of detection and quantification.

The MDEQ agrees with these comments regarding the characterization of the surface water and cultural resources. With respect to groundwater, air, and drinking water, the MDEQ believes that these pathways are being addressed as part of Dow's on-site corrective action

program. The MDEQ reserves its rights to require additional corrective action for these pathways, if deemed necessary. [12/1/06]

8. *Sediment Sampling: The proposed 25 sediment samples per approximately 22 miles of river is inadequate to adequately characterize the extent of the PCOI's (Principal Contaminants of Interest) within the Tittabawassee River sediments.*

The MDEQ agrees with this comment regarding the characterization of the extent of contamination. These comments are consistent with, and supportive of, deficiencies provided by the MDEQ in the March 2, 2006, NOD. These comments must be addressed by Dow in response to this NOD and the March 2, 2006, NOD. [5/1/06]

9. *The Identification of Exposure Pathways in the HHRA WP (Human Health Risk Assessment Work Plan):*

   (a) *Missing Relevant Exposures: the culturally relevant Native American exposures are missing from the HHRA WP. These are areas of concern for the tribe as data on native pathways is limited. Traditional and cultural uses will need to be quantified through a process to identify, evaluate and quantify exposure data. A preliminary list of potential pathways is below.*

<u>Special Residential Cultural/Native American</u>
Ingestion-Cultural
Exterior Soil & Dust (walking, gathering, hunting)
Homegrown Vegetables and Fruits (gardening) wild duck potato, wild rice, berries, medicinal plants for teas, poultices, etc…
Local Produce, Dairy, Eggs, Meat
Wildlife/Fish
Higher fish consumption per capita, whole fish preparation, turtle, wild turkey, deer (including deer liver, heart and kidneys), ducks, geese, squirrel, rabbit
Medicinal/Ceremonial
Four sacred foods: deer, corn, strawberry, wild rice
Corn Beans Squash: Three Sisters-Ceremonial
Sweet grass, cedar-sacred medicinal plants: smudging, purification
Black Ash: traditional basket making
Maple: sugar bush

Inhalation-Cultural
Interior-Exterior dust
Medicinal/Ceremonial
Smudging, camp fires, ceremonial fires, smoking food

Dermal-Cultural
Interior-Exterior dust
Medicinal/Ceremonial
Smudging, sweat lodge (steam), animal skins, claws, for clothing, drums, rattles, fans

Misc.
Breast feeding
Dow employees

(b) *Missing Relevant Exposures: breast milk exposure. Breast milk exposure has been demonstrated to be a major component of total exposure for infants and children. A high percentage of tribal mothers breast feed their children.*

The MDEQ concurs with these comments and has communicated these deficiencies to Dow as Deficiencies 14 and 17 in Attachment A and Comment 10 in Attachment B of the March 2, 2006, NOD. In addition to the preliminary list of potential exposures for Cultural/Native Americans provided above, the MDEQ is providing the lists of potentially relevant exposures by land use and the summary spreadsheets developed as concurrence documents by the Exposure Pathways Work Group that had participation by Dow, the MDEQ, the U.S. Environmental Protection Agency, Region 5, the Michigan Department of Community Health, the Michigan Department of Agriculture, and the Saginaw Chippewa Indian Tribe to assist Dow in the correction of these deficiencies. These comments are consistent with, and supportive of, deficiencies provided by the MDEQ in the March 2, 2006, NOD. These comments must be addressed by Dow in response to this NOD and the March 2, 2006, NOD. [5/1/06]

ATTACHMENT 3

Public Comments and Michigan Department of Environmental Quality (MDEQ) Responses/Notice of Deficiency (NOD) on The Dow Chemical Company (Dow) Tittabawassee River and Floodplain Remedial Investigation Work Plan (TR RIWP)

April 13, 2006

The public comments are shown in *italic font*. The MDEQ's responses to comments/deficiencies are shown in **bold font**. The "[5/1/06]" at the end of the MDEQ's response means this deficiency is to be addressed in the submittal due on May 1, 2006. The "[12/1/06]" at the end of the MDEQ's response means this deficiency is to be addressed in the submittal due on December 1, 2006. No date in brackets following the MDEQ's response denotes public comments/other information that is to be taken into account by Dow in revising the TR RIWP and/or Midland RIWP.

1. *This commenter appreciates the opportunity to comment and we look forward to DEQ and EPA ensuring vast improvements in Dow's Work Plans for the protection of public health and natural resources.*

   This commenter would also like to suggest MDEQ take a less "voluntary" approach to corrective action with Dow Chemical. The primary reasons being to expedite this issue and to stop wasting valuable tax dollars in an already strapped DEQ budget and to ensure that MDEQ has the necessary information and data to proceed with cleanup. It is our position that MDEQ has made a consistent effort to work with Dow Chemical to ensure consistency and compliance with their RCRA license. Unfortunately Dow Chemical does not appear terribly concerned about their legal or statutory obligations to the people of Michigan. Dow Chemical's energy is directed at public relations, designing their own science and delaying progress on this contamination. This cannot be tolerated because it is getting in the way of MDEQ ensuring it has all the information necessary for remediation and to ensure an equitable NRDA for the public.

   In January 2003 we were told that Dow's license was the mechanism by which this cleanup would be addressed. While Dow, via their RIWP, is attempting to rewrite the rules, science and regulations it begs us asking why this being permitted to take so long if indeed MDEQ has the authority to enforce the license. Not to oversimplify the issue but dioxin concentrations well exceed the RDCC of 90ppt and dioxin is being taken up by every living thing along that floodplain much to the determent of this watershed. We are now well into our third high water event along the Tittabawassee River since the discovery in November 2001. MDEQ needs to act expeditiously and with authority and carry out its' responsibility to the people of this watershed.

   To date, much of the emphasis has been on what Dow is willing to do. This dynamic needs to change. The new emphasis should be on what MDEQ can do with the authority granted by the corrective action license and by statute to protect people, restore habitat, collect data and initiate cleanup.

   This commenter would submit that as much as both MDEQ and Dow attempt to put a "happy face" of mutual respect and cooperation, nothing could be further from the truth. Dow Chemical is working against MDEQ and ultimately against every citizen of the state. We acknowledge that Dow Chemical is a stakeholder but we believe, as is evidenced by their extremely deficient and cunning RIWP, Dow Chemical is not playing by the rules nor are demonstrating they are respectful of their obligations.

No doubt a great deal of Dow's resistance to extensive sampling and characterization is due to pending litigation. Dow will likely continue to resist getting it right. This commenter strongly encourages MDEQ to take charge of this issue and write the most critical and immediate needs into the RIWP for Dow Chemical.

The MDEQ acknowledges these comments. The MDEQ is committed to the implementation of the operating license and believes that the corrective action mechanism that is mandated by the operating license is the appropriate path forward to a cleanup that is protective of human health and the environment. If necessary, the MDEQ will approve the TR RIWP with modifications to ensure that the most important and critical needs are addressed early in the corrective action process.

2. *Tittabawassee River Human Health Risk Assessment Work Plan (HHRAWP) Comments*

(a) *Section 3 and 4 provide general information on Potential Exposure Pathways and Receptor Populations. However, Section 3 and 4 should be modified to identify "all" of the PEP's and RP's that will be evaluated. In addition, these sections must be modified to include D/F exposures to infants and children, especially to nursing infants.*

The MDEQ concurs with these comments and has communicated these deficiencies to Dow as Deficiencies 14 and 17 in Attachment A and Comment 10 in Attachment B of the March 2, 2006, NOD. An Exposure Pathways Work Group met from July through December 2005 to identify the potential exposure pathways and human receptor populations of concern for dioxin and furan contamination in the Tittabawassee River and floodplain area of concern and the Midland Area Soils area of concern. This work group was formed to assist Dow in providing a consensus list of these identified exposure pathways and receptors by land use for the HHRA WP and had participation from Dow, the MDEQ, the U.S. Environmental Protection Agency (U.S. EPA), Region 5, the Michigan Department of Community Health, the Michigan Department of Agriculture and the Saginaw Chippewa Indian Tribe.

The MDEQ acknowledges and agrees with these comments, which are consistent with, and supportive of, deficiencies provided by the MDEQ in the March 2, 2006, NOD. These comments must be addressed by Dow in response to this and the March 2, 2006, NOD. The MDEQ is providing the lists of potentially relevant exposures by land use and the summary spreadsheets developed as concurrence documents by the Exposure Pathways Work Group as an appendix to this attachment to assist Dow in addressing this comment and the March 2, 2006, NOD. [12/1/06]

(b) *It appears to be Dow's intention to develop methodology by which to "predict" total dioxin exposure that is occurring to Riverside residents. That is not required for MDEQ to enforce the corrective action license. Dow (and the public) need to know the limitations of the PRA as well as the limitations to the application of the University of Michigan Exposure Investigation (EI).*

- *Will not establish a safe level below which adverse health effects may occur or a cancer risk level, as required by the regulations;*
- *Is not designed to focus on only those exposed;*
- *Does not include children, a sensitive subpopulation likely to have greater susceptibility to adverse effects and greater exposure;*
- *It is not credible, reliable or feasible to rely on a single exposure investigation to determine environmental cleanup standards.*

The MDEQ considers an evaluation of multipathway dioxin exposure critical in evaluating risks for residents of the Tittabawassee River floodplain. It is imperative that all potential exposures that are not negligible be included for noncancer risk assessment and all exposures related to the releases from Dow be considered for cancer risk assessment. This information will allow the MDEQ to prioritize the most substantial exposures for mitigation, ensure that these multipathway exposures combined will not exceed a threshold level for noncancer risk, and ensure that the total incremental increase in cancer risk from all exposures related to releases from Dow does not exceed 1 additional chance above the background cancer rate per 100,000 individuals. This total exposure approach is especially critical for this circumstance since there are several potential contributing sources of exposure to dioxins and furans from this widespread contamination, including local food chain sources (e.g., fish, wild game, and livestock), as well as the typical market basket exposure. The MDEQ expects that the University of Michigan Dioxin Exposure Study (UM DES) will provide useful information for the participants, impacted communities, and Dow, as well as the state and federal agencies for evaluating Dow's proposals for corrective action. However, the MDEQ concurs that the above bulleted items are some of the limitations of the UM DES.

The revised HHRA WP must include a clear description of the proposed uses of the UM DES for the HHRA and the limitations of the UM DES, including those described in this comment. [12/1/06]

(c) *Section 5, 7, 10, 12, 14, and 15 proposes the use of Independent Scientific Advisory Panels to review various aspects of the TR-HHRA. This is a time consuming endeavor that will create additional delays. It is believed that the MDEQ, the MDCH and the EPA have sufficient scientific expertise to be able to determine the validity of any and all aspects of the HHRA.*

The MDEQ has committed to a review by an independent science advisory panel(s) (ISAP) as part of the Framework for an Agreement (see Sections I.B.2. and III.B.2.) and expects this approach to strengthen the MDEQ's remedial decisions for this widespread contamination. The MDEQ expects to work with Dow to develop a HHRA WP that both the MDEQ and Dow can support prior to a review by an ISAP.

The HHRA WP must be revised to include a more detailed schedule of the proposed HHRA sequencing, which will allow for efficient coordination of ISAP reviews to minimize potential delay to address this comment and the March 2, 2006, NOD. [12/1/06]

(d) Section 9 proposes to modify the procedures used to establish the Part 201 Act 451 cleanup criteria of 90 ppt-TEQ. Modification of Part 201 is not part of the rights given Dow under the operating license.

Section 9 proposes to do a forward-looking risk assessment prior to identification of exposure pathways necessary to be included in the development of site-specific cleanup criteria. The MDEQ agrees that this approach is appropriate to focus the development of cleanup criteria on critical exposure pathways. The MDEQ concurs that components of Dow's proposed procedures, both for the screening level risk assessment phase and the forward looking risk assessment phase, would not comply with the requirements of Part 201, Environmental Remediation, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (Act 451), and would likely eliminate pathways that would need to be included in the development of site-specific cleanup criteria as stated as Deficiencies 20, 21, and 26 in Attachment A of the March 2, 2006, NOD.

The HHRA WP must be revised to be consistent with the applicable requirements of Part 201 as described herein and as stated as Deficiencies 20, 21, and 26 in Attachment A of the March 2, 2006, NOD. [12/1/06]

(e) *Section 11 provides additional comment on the development of AWCC but they are not authorized by Act 451.*

The MDEQ concurs with the comment that the area-wide cleanup criteria are not authorized by Part 201. The HHRA WP must be revised to be consistent with the applicable requirements of Part 201 as described herein and as stated as Deficiency 22 in Attachment A of the March 2, 2006, NOD. [12/1/06]

(f) *Section 16 provides for the option that Dow may propose alternate algorithms to those used in Part 201 Act 451. The use of any such algorithms must be part of the rulemaking process associated with a statewide modification of Part 201 and should not be considered as part of the HHRA process. Dow's obligation for dioxin cleanup and remediation must be carried out in compliance with standards established under Part 201 Act 451 until such time as Part 201 is amended.*

It is correct that Dow is required to use the Part 201 algorithms for exposure pathways covered by generic criteria, unless Part 201 is amended to allow an alternate algorithm. In some circumstances, though, exposure pathways that do not have Part 201 algorithms and exposure variables established must be evaluated (e.g., food chain contamination pursuant to R 299.5728; sediment contamination pursuant to R 299.5730). There is clear evidence in that the Tittabawassee River and floodplain contamination has resulted in other injuries (e.g., contamination of fish, wild game, chicken eggs, and ecologically relevant species) that are not accounted for, or protected by, the established Part 201 generic criteria or algorithms. However, it is important to note that Part 201 authorizes the development of site-specific cleanup criteria through Subsection 20120a(17) and R 299.5728 and R 299.5730 for these other injuries without the need to amend Part 201 or the associated administrative rules.

The MDEQ does not believe it is necessary to modify the RIWP(s) to specifically address these comments, as Dow is required to comply with the Part 201 requirements for developing site-specific cleanup criteria.

3. *General Comments on the HHRAWP*

The HHRAWPs for both Midland Area Soils and Tittabawassee River and Floodplain are very similar to each other and the commenter believes that some of the comments apply to both work plans.

(a) *Part XI.A.1 of the Hazardous Waste Management Facility Operating License for The Dow Chemical Company's Midland Plant states that the Chief of the Waste and Hazardous Materials Division has an obligation to implement actions "... to protect the public health, safety, welfare, or the environment, and includes, but is not limited to... cleanup, removal, remediation... containment, isolation.. [and] temporary relocation of people..." While it is recognized that Dow Chemical, under Part XI.B.3(b)(iv) of the license, has "the option to propose steps to develop site-specific cleanup criteria", this provision does not require that the MDEQ delay any actions deemed necessary "to protect the public health, safety, welfare. It appears Dow is challenging the validity of the 90 ppt TEQ criteria, or would like to present "improved" data that it would like to be considered in modifying the 90 ppt TEQ criteria, such*

activities must be carried out as provided for in Act 451 or other Michigan Acts and should not be part of the license provisions.

Part 201 allows for the proposal and use of site-specific cleanup criteria pursuant to Subsection 20120a(2). Although site-specific cleanup criteria can be authorized by the MDEQ for use as part of a specific remedial action, a site-specific cleanup criterion cannot replace a generic cleanup criterion.

Dow's operating license contains language that acknowledges that Part 201 allows for site-specific cleanup criteria, making it clear that Dow can propose to use probabilistic risk assessment (PRA) provided that Dow proposes steps (i.e., a work plan) for the development of any site-specific cleanup criterion as allowed pursuant to Part 111 and Part 201. The Framework for an Agreement also states "If Dow demonstrates that the use of probabilistic risk assessment improves the analysis and characterization of variability and uncertainties regarding exposure and risks, DEQ will consider the results of Dow's proposed use of probabilistic risk assessment in developing potential area wide and site-specific cleanup criteria for dioxins *in accordance with applicable law* [emphasis added]. These activities will proceed pursuant to an agreed-upon schedule."

The MDEQ does not believe it is necessary to modify the RIWP(s) to specifically address these comments as Dow is required to comply with the Part 201 requirements for developing site-specific cleanup criteria.

(b) *Part XI.B.3 (b)(iv) and other portions of the license refer to "site specific cleanup criteria" (SSCC). Dow has proposed the concept of an "area wide cleanup criteria" (AWCC) with the comment that the AWCC "... was inspired by the statutory language in Part 201..". Though Dow may have been "inspired" to create some sort of AWCC concept, it is not currently part of Part 201 or of Act 451. If Dow wishes to implement any AWCC concept, Part 201 will need be formally amended. The creation of any AWCC is beyond the scope of the operating license. Based on the unknown differences between SSCC's and any AWCC, MDEQ should eliminate the use of AWCC. Would appreciate MDEQ speculating on why AWCC language keeps appearing (2002 CACO HB 4617 HHRAWP)?*

The MDEQ acknowledges and concurs with this comment. While it is true that Part 201 does not specifically authorize "area wide cleanup criteria" as identified as Deficiency 22 in Attachment A of the March 2, 2006, NOD, regardless of the terminology used, the MDEQ will review and comment on any alternate cleanup criteria proposed by Dow, as appropriate, These comments are consistent with the MDEQ deficiency identified above and must be addressed in response to this NOD and the March 2, 2006, NOD. [12/1/06]

(c) *Dow's HHRAWP proposal indicated the intention to offer suggestions on the modification or possible replacement of the Risk Assessment Algorithms used to establish the Part 201 cleanup criteria of 90 ppt TEQ. A great deal of effort is being expended by Dow to establish a different RDCC number. Is this really a priority that should be considered? What would the numbers look like if the dioxin reassessment were released today? Input from EPA as to the latest science surrounding dioxin need to be considered to avoid any conflict and to ensure Michigan's DRCC in the future takes into account any new numbers that arise with the release of the dioxin reassessment. The 90 ppt DRCC should remain in place until the release of the dioxin reassessment.*

Part 201 allows for the proposal/use of site-specific cleanup criteria pursuant to Subsection 20120a(2). The MDEQ concurs that development of site-specific cleanup criteria

should benefit from the U.S. EPA's dioxin reassessment, if available prior to development of site-specific cleanup criteria. Additionally, the MDEQ concurs that the schedule and/or sequencing for the HHRA needs to address development of toxicity values after development of exposure parameters to allow consideration of the most current information on the toxicity (i.e., from the U.S. EPA's dioxin reassessment, if available), as stated as Deficiencies 18 and 26 in Attachment A of the March 2, 2006, NOD.

These comments are consistent with the MDEQ deficiencies identified above and must be addressed in response to this NOD and the March 2, 2006, NOD. [12/1/06]

(d) *Part XI.B.3 (b)(iv) requires that Part 201 of Act 451 be amended prior to implementation of MDEQ site-specific criteria. It can be expected that rulemaking will introduce a delay of unknown duration into the cleanup and remediation deemed to be necessary by the MDEQ to protect public health. Implementation of cleanup and remediation should not be delayed until rulemaking is completed.*

Part 201 allows for the proposal/use of site-specific cleanup criteria pursuant to Subsection 20120a(2) without any amendments to Part 201 or its administrative rules. The language in Condition XI.B.3.(b)(iv) of Dow's operating license does not require amendment of Act 451 or revision of its administrative rules. However, the language in Condition XI.B.3.(b)(iv) of the operating license does require implementation of other requirements from the statute and rules (e.g., applicable land use or resource use restrictions).

The MDEQ does not believe it is necessary to modify the RIWP(s) to specifically address these comments.

(e) *Dow's proposed HHRAWP made general reference to the collection of "Reference Sampling" to expand the database on background levels of dioxins, furans and Potential Constituents of Interest (PCOI's). While this information may be of general scientific interest, it was not used to establish the Part 201 cleanup criteria of 90 ppt TEQ and would not have any value in establishing a SSCC for the Midland and Tittabawassee areas. Like so many of Dow's endeavors MDEQ should ask why? While there is likely some merit in adding to the scientific knowledge of background levels of PCOI's in other parts of the state, it is not germane to any SSCC cleanup criteria that the MDEQ might approve and the collection of such data will only create additional delays. It should not be part of either HHRAWP's.*

Part 201 allows the use of "background" in place of a generic cleanup criterion (R 299.5706a(5)(b) and R 299.5707). However, the MDEQ is concerned that the reference area locations may not fit the Part 201 definition of "background." "Background" is defined in R 299.5701(b) as "…the concentration or level of a hazardous substance which exists in the environment at or regionally proximate to a site that is not attributable to any release at or regionally proximate to the site." These types of proposals will need to be evaluated on a case-by-case basis, as in some cases the background areas proposed by Dow may have been affected by releases from Dow. For example, there is the potential for airborne releases of contaminants from Dow to affect soil and sediment quality in one of the proposed reference areas upstream of Dow (i.e., Emerson Park). It would not be appropriate to use areas for "background" that have been affected by releases from Dow or other sources to eliminate PCOIs from further consideration.

These comments are consistent with the issue identified in Deficiency 24(c) in Attachment A of the March 2, 2006, NOD and must be addressed in response to this NOD and the March 2, 2006, NOD. [12/1/06]

(f) *EPA stated the proposed HHRAWPS, as proposed by Dow, do not comply with EPA policy or guidance. How is it Dow did not know what EPA guidelines were?*

The MDEQ acknowledges this comment. The U.S. EPA and the MDEQ have previously provided direction to Dow on the U.S. EPA's policy and guidance.

(g) *This commenter is comfortable with EPA and MDEQ's comments on the deficiencies in Dow's HHRAWP's and we trust both agencies will continue diligent oversight of the science to ensure the protection of public health and natural resources as well as the application of legitimate scientific practice. It is apparent that both the TR-HHRAWP and the MI-HHRAWP are deficient in several areas and should be viewed as an attempt on the part of the licensee to delay even further any significant remediation and cleanup of dioxin contaminated areas. Since the licensee has sufficient resources and has had ample opportunity to submit adequate HHRAWP's and has failed to do so, it is recommended that the MDEQ/EPA without further input from Dow write the Human Health Risk Assessment Work Plan and submit an invoice to Dow for repayment of time.*

The MDEQ acknowledges this comment. Pursuant to Dow's operating license, Dow has been afforded the opportunity to correct the deficiencies in the HHRA WPs. The MDEQ does have the authority to approve any work plan with modifications. The MDEQ would prefer to work with Dow to develop HHRA WPs that both the MDEQ and Dow can support prior to a review of the work plans by an ISAP.

4. *Tittabawassee River Remedial Investigation Work Plan*

(a) *Dow's proposal for taking approximately one sample per river mile is not acceptable. Given the historical nature of the contamination, the dynamic nature and contours of the Tittabawassee River, Dow must be required to submit a very detailed, scientifically supportable plan to FULLY characterize the extent of their contamination. In discussions with some staff at NRDC the testing grid applied to the Hudson River PCB contamination was around 18 samples per quarter acre. This is submitted not so much for its scientific merit as it demonstrates the anemic efforts of Dow Chemical.*

The MDEQ acknowledges this comment, which is consistent with the deficiencies that were provided to Dow on this issue in the March 2, 2006, NOD.

(b) *Compliance with a schedule is required by Dow's corrective action license. Dow must submit a timeline for completion of all proposed activities in their RIWP, in accordance with their approved SOW. These time line cannot be permitted to create any delays, set backs or lapses in data collection. Coordination of all ongoing activities is paramount. Would like to refer MDEQ to the proposed MDEQ Timelines established before the Framework Agreement.*

The MDEQ acknowledges this comment, which is consistent with the deficiencies that were provided to Dow on this issue in the March 2, 2006, NOD.

(c) *MDEQ has repeatedly instructed Dow Chemical to work toward identify key exposure pathways which the RIWP fails to do. Would suggest due to the significance of exposure pathway identification that MDEQ-EPA undertake this activity for Dow Chemical.*

The MDEQ concurs with these comments and has communicated these deficiencies to Dow as Deficiencies 14 and 17 in Attachment A and Comment 10 in Attachment B of the March 2, 2006, NOD. The MDEQ is providing the lists of potentially relevant exposures by land use and the summary spreadsheets developed as concurrence documents by the Exposure Pathways Work Group as an appendix to this attachment to assist Dow in addressing this comment and the March 2, 2006, NOD. The revised RIWP(s) must include the above referenced pathways (see also the previous comments on this issue). [12/1/06]

(d) *TR RIWP must include identifying the historical uses of Dow's property along the Tittabawassee River.*

The MDEQ agrees with this comment, which is applicable to the TR RIWP, as well as the NRDA. The TR RIWP must be modified to specifically address and respond to this comment by providing a history of Dow land uses along the Tittabawassee River. [12/1/06]

(e) *Dow is proposing to test the hypothesis of the random distribution of dioxin. What's the relevance? Is this really the time to be testing a hypothesis?*

The MDEQ concurs with this comment, which is addressed by Deficiency 7 in Attachment A of the March 2, 2006, NOD. With respect to the relevance of this issue, the MDEQ agrees that it is important to understand the distribution of dioxin and other contaminants in sediment because this information will be used in determining remedial alternatives. The TR RIWP must be revised to address this comment. [5/1/06]

(f) *TR RIWP should include soil sampling of the Priority 2 properties and any Priority 1 properties needing to be readdressed as a result of this weeks flooding (March 12th 2006). This should not continue to be an option for Dow. These frequently flooded areas are significant as part of the depositional pattern of the river.*

The MDEQ concurs with the need to conduct soil sampling at repeatedly flooded residential and agricultural properties. This comment is consistent with Deficiency 5 in Attachment A of the March 2, 2006, NOD, which requires sampling of representative Priority 1 and 2 Interim Response Activity properties as part of the initial phase of the TR RIWP. The revised TR RIWP must include soil sampling as described above and in Deficiency 5 in Attachment A of the March 2, 2006, NOD. [5/1/06]

(g) *TR RIWP should stipulate that Dow Chemical, upon locating any "hot spots" in the river, will be required to remove them immediately and not allow these sediments and soils to shift and be dispersed with each high water event.*

The MDEQ concurs with this comment in concept, but does not believe that the implementation of this concept is currently practical. The MDEQ will continue to evaluate this concept both in the development of the TR RIWP and in the consideration of additional interim response activities. The MDEQ agrees that as areas of high contamination are found they should be removed before the contamination is redistributed. The MDEQ does not believe it is necessary to modify the TR RIWP to specifically address this comment, although this comment must be considered by Dow in the development of the revised TR RIWP and in potential interim response activities.

5. *Comments on the Dow Chemical Company's Proposed SLERA and BERA*

(a) *Limited Geographical Scope. A fundamental concern we have is the limited geographical scope of both the sampling and risk assessment protocols. Sampling from various governmental agencies including the Army Corps of Engineers, EPA and Michigan Department of Environmental Quality has found dioxin/furans identical to those found in the Tittabawassee River in both the Saginaw River and Inner Saginaw Bay. Those levels have matched and in several dramatic instances exceeded levels found in the Tittabawassee River. Despite this knowledge, and the Dow Chemical Company license requirements to respond to all offsite contamination, Dow proposes to only investigate the Tittabawassee River and floodplain. Why has the company neglected to respond to the full scope of its obligations? It's imperative that the entire ecosystem be addressed at the same time.*

Please refer to the MDEQ's response to Trustees' Comment 3 in Attachment 2 of this NOD, which also addresses the above comments.

(b) *Neglect of American Woodcock and Hooded Mergansers. Though we recognize that not all bird species can be studied in any ecological study, it would seem imperative, given the levels of dioxin/furans in earthworms, to study a bird species whose diet is heavily dependent on earthworms, such as the Woodcock. Similarly, initial sampling has already disclosed high levels of dioxin/furans in Hooded Mergansers eggs. It would follow that both of these species should be included in any wildlife study, and we would like to know why they were excluded?*

Please refer to the MDEQ's response to Trustees' Comment 5 in Attachment 2 of this NOD, which also addresses the above comments. [12/1/06]

(c) *Gap in Predatory Mammals. What is the biological uptake of local toxics is the question of most magnitude in this and any ecological investigation involving toxics in the soil and sediment. For that reason, it baffles us as to why those animals feeding highest on the food chain were neglected in the proposed study. We speak of red fox and coyote. It is our understanding that the habitat in the Tittabawassee River floodplain is excellent for both species, and would expect their inclusion in any ecological study. Why were they not proposed? Similarly, it is our understanding that the existing habitat is excellent for river otters. Why have they not been included in the study? If the consultants' response is that river otters have not been found, given historical evidence of their presence, and their exclusive diet of fish, what conclusions can be made?*

Please refer to the MDEQ's response to Trustees' Comment 5 in Attachment 2 of this NOD, which also addresses the above comments. With respect to the inclusion of river otters, the MDEQ will defer to the expertise of the Michigan Department of Natural Resources and the U.S. Fish and Wildlife Service on this issue, which would best be addressed as part of the NRDA process. [12/1/06]

(d) *Absence of Fish. We realize that fish are part of the study in as much as they provide food for animals studied, particularly mink. However, it is a major deficiency of the proposal to leave out the uptake of toxics in fish. Fish, of course, are a clear part of the human food chain, and major recreational and tourist attraction. Knowledge of the uptake of dioxins/furans would provide important insight into the costs of the contamination*.

The MDEQ concurs with this comment. Fish must be included in both the ecological and human health risk assessments, as well as for the NRDA purposes. The TR RIWP must be revised to specifically address and respond to this comment. [12/1/06]

(e) *Absence of Reptiles and Amphibians. There is no mention in the proposed ecological study of reptiles and amphibians. Turtles and frogs are presumably part of the food chain, and an entire family of species. Why were they neglected? Frogs, in particular, have been described internationally as the proverbial canary in the mine. The disappearance of frogs and the well-publicized frog mutations have focused much public attention on the species. Why wouldn't Dow consider frogs to be a primary subject of any local ecological investigation?*

The MDEQ concurs with this comment. Reptiles and amphibians must be included in both the ecological and human health risk assessments, as well as for the NRDA purposes. Snapping turtle, in particular, is harvested for food from the Tittabawassee River and is important as a cultural food source. The TR RIWP must be revised to specifically address and respond to this comment. [12/1/06]

(f) *Failure to Propose Caged Mink Study. In the 1960s, following the deaths and reproductive failures among ranch mink fed Great Lakes fish, Michigan State University biologists Richard Aulerich and Robert Ringer conducted a series of studies which found the mink were dying because they were highly sensitive to PCBs. Given the similarity of PCBs to dioxin/furan contamination in Tittabawassee River fish, in seems reasonable in any competent ecological study, to determine the effect of these fish on caged mink. Why is Dow proposing to dose the food given to the caged mink instead of feeding them fish from Tittabawassee River?*

The MDEQ concurs with this comment. Fish from the Tittabawassee River must be used to determine if adverse effects are occurring in mink. This can be done in conjunction with mink feeding studies that Dow is proposing to conduct to evaluate individual contaminants. The TR RIWP must be revised to specifically address and respond to this comment. [12/1/06]

(g) I*nadeguate Bio-Uptake Research. The Michigan State University bio-uptake study appears to be nothing more than a pilot study. With only four sites downriver from Dow and two upriver, the number seems completely inadequate from a scientific perspective. How can one extrapolate from a mere six sites? Moreover, the sites themselves appear to have been selected more for convenience than any scientific protocol. Given the dynamic and varied ecology of the floodplain, a grid and random selection process should have been used, with hundreds of samples taken along random locations throughout the twenty-four mile floodplain.*

Please refer to the MDEQ's response to Trustees' Comment 5 in Attachment 2 of this NOD, which also addresses the above comments. Also, see the comments that were previously provided to Dow and its contractors addressing the design of the ecological risk assessment. [12/1/06]

(h) *General Comments: Analysis is not a substitute for action. While all the above criticisms of Dow's submittals we believe are valid, and, in fact, would make any ecological study more reliable, they are not our primary concern.*

We believe the sampling conducted by the U.S. Army Corps of Engineers (ACOE), the Michigan Department of Environmental Quality (MDEQ), and Dow consultants, have all supported the position that elevated levels of dioxins and furans, higher than any area in the

state, are present in the sediment of the Tittabawassee River, the Saginaw River and bay, as well as the floodplain of the Tittabawassee River. The highest levels are near the river and diminish with distance from the river consistent with periodic flooding. The sediment contaminants are being regularly washed downstream from their source in the Tittabawassee to the confluence of the Saginaw River, down the Saginaw River and into the bay.

The preliminary ecological studies demonstrate bioaccumulation in deer, wild turkeys, squirrels, mergansers' eggs and earthworms. The Michigan Department of Community Health (MDCH) has issued only the second wildlife consumption advisory in its history for turkeys, deer and squirrels in the Tittabawassee floodplain. MDCH has also issued fish consumption advisories on several species of fish in the Tittabawassee and Saginaw Rivers. The Michigan Department of Agriculture (MDA) has issued food, farming and garden advisories for the Tittabawassee River floodplain based on dioxin/furan contamination. Moreover, the twenty-five participants in the Pilot EI conducted by MDCH showed dioxin body burdens at levels above or at high end of normal range.

This commenter believes that this information, collected in the four years since the discovery of elevated dioxin/furan levels in the watershed is sufficient to invoke the precautionary principle, and require of the responsible party, the Dow Chemical Company, to begin remediation. We believe that all sampling must be directed towards, not only determining the geographical boundaries in all impacted areas, but the removal and disposal of high levels when they are discovered. We believe that the delays caused by the responsible party's inadequate Scopes of Work and now, responses to the Framework and license requirements, have exacerbated the problem. All delay places a greater burden on the downstream ecology, flooding Inner Saginaw Bay with irretrievable contaminants; contaminants that have already impacted lake trout populations in Lake Huron, and would threaten recreational and commercial fisheries, as well as tourism in Lake Huron. But the greater responsibility lies with addressing the human families that live, work and play in some of the highest concentrations of dioxins and furans in the state.

The state knows enough to act. The willingness of the State of Michigan to tolerate these delays by Dow Chemical is a failure of will, and a violation of its obligations to protect the public and the publics' resources. For Dow Chemical to continue to obfuscate, delay and deny, is to violate its charter as a corporate entity, and make contemptible, its recent history of philanthropy. This commenter insists immediate efforts be directed to developing a comprehensive plan to fully characterize the extent of the contamination, develop a plan for remediation and restoration, including but not limited to, riverbank stabilization, removal and disposal of contaminated river sediment and floodplain soils, and complete restoration of the ecology of the floodplain and properties of those that reside in the floodplain.

The MDEQ acknowledges these comments.

(i) *DEQ needs to identify steps that Dow can take right now to protect exposure in the parks as well as in people's homes.*

The MDEQ acknowledges and agrees with this comment and notes that Dow has voluntarily implemented interim response activities in many of the parks along the Tittabawassee River to reduce exposure to dioxin and furan contamination. The MDEQ has also worked with Dow to place advisory signage in parks that addresses contact with contaminated soils and fish advisories. The MDEQ does not believe it is necessary to modify the TR RIWP to specifically address this comment.

(j) *DEQ should stop all construction of fishing peers along the Tittabawassee River. It is sending a message to children, regardless of fish advisory signs, that fishing is OK.*

The MDEQ agrees that this is a difficult issue that has a high potential to send a "mixed message." A number of species of fish from the Tittabawassee River are considered safe to eat as long as the fish consumption advisories are followed. There are also fish from the Tittabawassee River that should not be eaten. The MDEQ believes the fish advisory signs that were placed along the river last year are a step in the right direction. The fishing docks do encourage fishing from the river. The value of properly maintained docks is that they will provide a "clean" area to sit and fish, rather than sitting in contaminated soil along the river bank. The MDEQ does not believe it is necessary to modify the TR RIWP to specifically address this comment.

(k) *What plans does Dow or DEQ have to stop these areas of high concentrations of dioxin from being moved around every time the river floods?*

The information necessary to answer this question will be developed as part of the remedial investigation process. While investigation is ongoing, it is probable that Dow will be required to implement additional interim response activities to limit the movement of contaminated materials in the short term. These measures could include bank stabilization, upland erosion control, and/or the construction of sediment traps. The MDEQ does not believe it is necessary to modify the TR RIWP to specifically address this comment at this time.

(l) *Dow is consistent in submitting plans that do (not?) meet the expectations of the law, DEQ or EPA. Things could best be moved along if DEQ just took charge of the plans and wrote them for Dow.*

The MDEQ acknowledges this comment. Pursuant to its operating license, Dow has been afforded the opportunity to correct the deficiencies in the RIWP(s). The MDEQ does have the authority to approve any of Dow's work plans with modifications if they continue to be deficient. The MDEQ would prefer to work with Dow to develop work plans that comply with the regulations and that both the MDEQ and Dow can support.

(m) *I understand data collection is important but we should not have to wait until everything is done before the state acts or initiates some cleanup plans. I understand that GM removed "hot spots" of PCB's from the Saginaw River very successfully.*

The MDEQ acknowledges this comment. As noted above, while investigation is ongoing, it is probable that Dow will be required to implement additional interim response activities to limit the movement of contaminated materials in the short term. These measures could include bank stabilization, upland erosion control, and/or the construction of sediment traps.

(n) *Dow appears to want to develop science to change the 90 ppt to a more favorable number. If 90 ppt is the law, Dow should not be in business of rewriting science or the law.*

Part 201 does allow for the proposal/use of site-specific cleanup criteria pursuant to Subsection 20120a(2). Although site-specific cleanup criteria can be authorized by the MDEQ for use as part of a specific remedial action, a higher, alternate site-specific cleanup criterion cannot replace a generic cleanup criterion across the board without amendment of the Part 201 statute and/or regulations through an appropriate, legal process. The MDEQ does not believe that modification of the RIWP(s) is necessary to specifically address this

comment as Dow and others are required to comply with the Part 201 requirements for developing site-specific and generic cleanup criteria.

(o) *DEQ should get the information they need most to began taking steps to cleanup this contamination. If Dow resists. Write it for them.*

The MDEQ acknowledges this comment. Pursuant to its operating license, Dow has been afforded the opportunity to correct the deficiencies in the RIWP(s). The MDEQ does have the authority to approve any of Dow's work plans with modifications if they continue to be deficient. The MDEQ would prefer to work with Dow to develop work plans that comply with the regulations and that both the MDEQ and Dow can support.

(p) *Several times in the past Dow has asked for Area Wide criteria. At the last meeting, Mr. Sygo said their was no legal definition. If there is no definition than Dow should not be permitted to develop criteria for anything Area Wide.*

The MDEQ has acknowledged that Part 201 does not authorize "area wide cleanup criteria" in Deficiency 22 in Attachment A of the March 2, 2006, NOD. Part 201 does allow for the proposal/use of site-specific cleanup criteria pursuant to Subsection 20120a(2). The MDEQ will evaluate any proposed site-specific criteria in accordance with the requirements of Part 201 and the associated administrative rules. These comments are consistent with the deficiency identified above and must be addressed in response to this NOD and the March 2, 2006, NOD. [12/1/06]

(q) *Based on EPA noted deficiencies, all references to the use of a Probabilistic Risk Assessment should be deleted. Any statistical method which allows the polluter to "dial" in the desired result based on unsubstantiated and/or subjective factors is unacceptable.*

Part 201 does allow for the proposal/use of site-specific cleanup criteria pursuant to Subsection 20120a(2) and does not exclude the use of probabilistic risk assessment. The MDEQ will evaluate any proposed site-specific cleanup criteria in accordance with the requirements of Part 201 and the associated administrative rules. The MDEQ does not believe that it is necessary to modify the RIWP(s) to specifically address these comments as Dow is required to comply with the Part 201 requirements for developing site-specific cleanup criteria.

6. *At the meeting this past Thursday, Dow stated that their current work plan will be to do more testing on the 8 year floodplain along the Tittabawassee. They concluded that there are no high levels outside of this area, so that is where they plan to do more tests.*

   I disagree. If anything, they need to be conducting future studies in the much broader 100 year floodplain to find out exactly how far their contamination has spread.

   It is my opinion that they have chosen to only study the 8 year flood area because it is indisputable that it is contaminated already. For them to test and find high levels outside of this area only gives our current lawsuit more ammunition, which they are currently fighting the boundaries of.

   I am confident that they would find many areas outside of the 8 year floodplain with high levels of dioxin.

We will be included in the priority 2 area this coming year, and I plan to ask for more testing close to our house. Especially in light of the fact that DEQ has found an elevated level right out our backdoor, no where even near the 100 year floodplain. My neighbor who lived here before this house was built, swears that there was never any dirt from the floodplain moved to higher ground on our property prior to this house being built. I hope DEQ backs us up when we request additional testing on our property by Dow.

The MDEQ concurs that additional testing needs to be conducted in order to determine the lateral extent of contamination beyond the identified 8-year floodplain. The March 2, 2006, NOD addresses the need to conduct representative sampling of Priority 1 and 2 properties in order to assist in making this determination. As the MDEQ has previously noted, the relocation of soils from the floodplain remains poorly understood and will need to be addressed during the remedial investigation process. These comments are consistent with Deficiency 5 in Attachment A of the March 2, 2006, NOD, and must be addressed in response to this NOD. [5/1/06]

7. *I wish to raise two basic issues relative to Human Health Risk Assessment (HHRA) of reference document.*

   (a) *First, this HHRA must reach far beyond the riparian owners of the lands involved. There can be no question about the navigability of the Tittabawassee and Saginaw Rivers. These are Public resources subject to the Public Trust Doctrine, emphasized in the Michigan Constitution and supported by both the Michigan and United States Supreme Courts. These are public waterways subject to full public use, a fact that has not been emphasized in ongoing commentary.*

   Certainly, private riparian owners enjoy riparian rights and privileges but these riparian rights are both preceded and superseded by the Public Trust.

   I suggest that HHRA must apply to the public at large whenever, wherever and for whatever legal use is made of the public resource.

The MDEQ agrees that the general public, the public trust resources, as well as private residents and other users of contaminated properties, and public resources must be adequately protected and/or the public resources restored. The MDEQ has required Dow to assess other injuries to the public resources necessary to protect public health, safety, welfare, and the environment pursuant to Subsection 20120a(17), R 299.5728, and R 299.5730 of the administrative rules promulgated pursuant thereto. These requirements will ensure other injuries from contaminated soils (e.g., food chain contamination, impairment of soil for agricultural purposes, and erosion of contaminated soil to surface water) and contaminated sediments (e.g., restrictions on fish or wildlife consumption; restrictions on dredging activities; and added costs to agriculture, industry, or local units of government) are considered as part of the assessment of risks and cleanup levels.

The MDEQ acknowledges and agrees with these comments. These comments are consistent with, and supportive of, deficiencies provided by the MDEQ in the March 2, 2006, NOD. These comments must be addressed in response to this NOD and the March 2, 2006, NOD. [12/1/06]

   (b) *A second basic issue is much more complex. How will HHRA deal with <u>all</u> receptor populations and <u>all</u> receptor pathways? How will the impact of maternal body burden to the human <u>fetus</u> and/or a <u>nursing infant</u> be considered? Body burden of persistent, potentially*

toxic, transplacental, fat soluble chemicals will obviously be augmented by any incremental biouptake from any of several sources by any of several routes.

As I read and re-read reference document I cannot be certain that the human fetus and/or nursing infant will meet the listed qualifications such as:

"…relevant and complete exposure pathways…" or
"exposure pathways for a given land use…" or
…land use under evaluation…" or
… 4. a point of potential human contact with the affected medium…"
or others scattered throughout the document.

<u>This uncertainty is unacceptable.</u>

The public needs to know. What is the intent of the State and Federal agencies and The Dow Chemical Company relative to inclusion of the general public and consideration of the human fetus, nursing infant and maternal body burden in the assessment of human health risk?

The MDEQ concurs with these comments and has communicated these deficiencies to Dow as Deficiencies 14 and 17 in Attachment A and Comment 10 in Attachment B of the March 2, 2006, NOD. These comments address all receptor populations, including fetuses, infants, and children and all exposure pathways, including breastfeeding, clearly in the HHRA WPs. The MDEQ is providing the lists of potentially relevant exposures by land use and the summary spreadsheets developed as concurrence documents by the Exposure Pathways Work Group, that met from July through December 2005, as an appendix to this attachment to identify the potential exposure pathways of concern for dioxin and furan contamination in both the Midland Area Soils area of concern and the Tittabawassee River and floodplain area of concern. This work group was formed to assist Dow in providing a consensus list of exposure pathways and receptors by land use for the HHRA WPs and had participation by Dow; the MDEQ; the U.S. EPA, Region 5; the Michigan Department of Community Health; the Michigan Department of Agriculture; and the Saginaw Chippewa Indian Tribe.

The MDEQ considers an evaluation of total dioxin exposure critical in evaluating risks for residents of the Tittabawassee River floodplain. It is imperative that all potential sources that are not negligible be included for noncancer risk assessment and all exposures related to the releases from Dow be considered for cancer risk assessment. This information will allow prioritization of the most substantial exposures for mitigation, ensure that total exposure will not exceed a threshold level for noncancer risk, and ensure that the total incremental increase in cancer risk from all exposures related to releases from Dow does not exceed 1 additional chance above the background cancer rate per 100,000 individuals. This total exposure approach is especially critical for this circumstance since there are several potential contributing sources of exposure to dioxins and furans from this widespread contamination, including local food chain sources (e.g., fish, wild game, and livestock), as well as the typical market basket exposure.

The MDEQ acknowledges and agrees with these comments. These comments are consistent with, and supportive of, deficiencies provided by the MDEQ in the March 2, 2006, NOD. These comments must be addressed in response to this NOD and the March 2, 2006, NOD. [12/1/06]

(c) *I realize that the body burden issue is very complex, contains many unanswered questions, and so far as I know, is not subject to an easily calculated solution. However, the issue is real, is not going away and needs to be addressed. While the ongoing bioavailability and blood serum studies will provide additional and very interesting data, I doubt that either study will address fetal organismic or infant development questions.*

Methods are available for addressing differences in body burdens when extrapolating from animal toxicity studies to evaluate human exposures to dioxins that have been developed by the U.S. EPA, World Health Organization/European Union, and United Kingdom. These methods adjust experimental animal intake levels to human intake levels that will result in an equivalent body burden based on the differences in the length of time (half-life) dioxin remains in the bodies of the different species. Additional adjustments have also been developed to convert a single dose gestational exposure level to a longer term chronic exposure level (as would be expected from environmental exposures) that will result in an equivalent maternal body burden and/or fetal tissue level related to an adverse developmental effect. Examples of these methods are found in the following sources:

- **World Health Organization (2001) *Summary and Conclusions*, Joint FAO/WHO Expert Committee on Food Additives (JECFA) Fifty-Seventh Meeting, Rome, June 2001. Available online at http://www.who.int/ipcs/food/jecfa/summaries/en/summary_57.pdf.**

- **United Kingdom Department for Environment, Food and Rural Affairs and the Environment Agency (2003) *Contaminants in Soil: Collation of Toxicological Data and Intake Values for Humans Dioxins, Furans and Dioxin-like PCBs.* Available online at http://www.deq.state.mi.us/documents/deq-rrd-uk-soil-dioxins-intake.pdf.**

- **U.S. EPA, National Center for Environmental Assessment, *Exposure and Human Health Reassessment of 2,3,7,8-Tetrachlorodibenzo-p-Dioxin (TCDD) and Related Compounds National Academy Sciences (NAS) Review Draft.* Available online at http://www.epa.gov/ncea/pdfs/dioxin/nas-review/.**

The MDEQ acknowledges and agrees with these comments. These comments are consistent with, and supportive of, deficiencies provided by the MDEQ in the March 2, 2006, NOD. These comments must be addressed in response to this NOD and the March 2, 2006, NOD. [12/1/06]

Appendix to Attachment 3

MIDLAND AND TITTABAWASSEE RIVER MEDIA
Site-Related Exposure Pathways
Arranged By Part 201 Land Use Category and Exposure Route
Dioxins and Furans Only

Table 1. Tittabawassee River Floodplain Soils and Sediments - Potentially Affected Media, Human Exposure Pathways, Risk Criteria Evaluation and Exposure Data Needs for Dioxins and Furans

Table 2. Midland Area Soils - Potentially Affected Media, Human Exposure Pathways, Risk Criteria Evaluation and Exposure Data Needs for Dioxins and Furans

MIDLAND AND TITTABAWASSEE RIVER MEDIA

Site-Related Exposure Pathways[1]
Arranged By Part 201 Land Use Category and Exposure Route
Dioxins and Furans (D/F) Only

1. Residential/Commercial I (Receptors: Urban Midland Residents)

► *Ingestion: on-property contaminant source*

Interior/Exterior Soil & Dust

Homegrown Vegetables/Fruits & Incidental Soil

Ingestion: off-property contaminant source

Interior/Exterior Soil & Dust (work/recreation)

Sediment & Surface Water (recreation)

Wildlife/Fish (recreation)

Local Produce, Dairy, Eggs, Meat

Potable Groundwater Uses – Not Relevant
(D/F – not likely to leach (NLL) through soil to groundwater as noted in the Part 201 Criteria Tables)

► *Inhalation: on-property contaminant source*

Interior/Exterior Dust

Inhalation: off-property contaminant source

Interior/Exterior Dust (work/recreation)

Volatilization – Not Relevant for D/F based on Henry's Law Constant

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► *Dermal: on-property contaminant source*

Interior/Exterior Soil & Dust

Dermal: off-property contaminant source

Interior/Exterior Soil & Dust (work/recreation)

Sediment & Surface Water (recreation)

Potable & Non-Potable Groundwater Uses – Not Relevant
(D/F – NLL through soil to groundwater as noted in the Part 201 Criteria Tables)

[1] Baseline exposures to be considered during the overall human health risk assessment for each land use and receptor category

2. Residential/Commercial I (Non-Agriculturally Zoned) (Receptors: Rural Floodplain Residents)

► *Ingestion: on-property*	*Ingestion: off-property*
Interior/Exterior Soil & Dust	Interior/Exterior Soil & Dust (work/recreation/adjoining agricultural)
Homegrown Vegetables/Fruits & Incidental Soil	Sediment & Surface Water (recreation)
Wildlife/Fish (recreation)	Wildlife/Fish (recreation)
Local Produce, Dairy, Eggs, Meat	Local Produce, Dairy, Eggs, Meat

Potable Groundwater Uses – Not Relevant
(D/F – NLL through soil to groundwater as noted in the Part 201 Criteria Tables)

► *Inhalation: on-property*	*Inhalation: off-property*
Interior/Exterior Dust	Interior/Exterior Dust (work/recreation/adjoining agricultural)

Volatilization - Not Relevant for D/F based on Henry's Law Constant

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► *Dermal: on-property*	*Dermal: off-property*
Interior/Exterior Soil & Dust	Interior/Exterior Soil & Dust (work/recreation/adjoining agricultural)
	Sediment & Surface Water (recreation/irrigation)

Potable & Non-Potable Groundwater Uses – Not Relevant
(D/F – NLL through soil to groundwater as noted in the Part 201 Criteria Tables)

3. Commercial II/Industrial (Receptors: Urban/City, Rural Industrial or Similar Commercial Workers)

► *Ingestion:*

Interior/Exterior Soil & Dust (agricultural from off-property source also considered)

Local Produce, Dairy, Eggs, Meat, Fish/Wildgame - Not Relevant for on-site exposures

Potable Groundwater Uses – Not Relevant
(D/F – NLL through soil to groundwater as noted in the Part 201 Criteria Tables)

► *Inhalation:*

Interior/Exterior Dust

Volatilization – Not Relevant for D/F based on Henry's Law Constant

---

► *Dermal:*

Interior/Exterior Soil & Dust

Sediment & Surface Water

Potable & Non-Potable Groundwater Uses – Not Relevant
(D/F – NLL through soil to groundwater as noted in the Part 201 Criteria Tables)

4. Commercial III (Receptor: Outdoor Worker – Low Soil Intensive)

► *Ingestion: Outside*

Interior/Exterior Soil & Dust (agricultural from off-property source also considered)

Local Produce, Dairy, Eggs, Meat Fish/Wildgame - Not Relevant for on-site exposures

Potable & Non-Potable Groundwater Uses – Not Relevant
(D/F – NLL through soil to groundwater as noted in the Part 201 Criteria Tables)

► *Inhalation: Outside*

Interior/Exterior Dust

Volatilization – Not Relevant for D/F based on Henry's Law Constant

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► *Dermal: Outside*

Interior/Exterior Soil & Dust

Sediment & Surface Water

Potable & Non-Potable Groundwater Uses – Not Relevant
(D/F –NLL through soil to groundwater as noted in the Part 201 Criteria Tables)

5. Commercial IV (Receptors: Outdoor (Groundskeeping) Workers – High Soil Intensive) (Additional Receptors: Non-Residential Agricultural [Migrant] Worker)

► *Ingestion: Outside*

Interior/Exterior Soil & Dust (agricultural from off-property/on-property for agricultural migrant worker source also considered)

Local Produce, Dairy, Eggs, Meat Fish/Wildgame - Not Relevant for on-site exposures

Potable & Non-Potable Groundwater Uses – Not Relevant
(D/F –NLL through soil to groundwater as noted in the Part 201 Criteria Tables)

► *Inhalation: Outside*

Interior/Exterior Dust

Volatilization – Not Relevant for D/F based on Henry's Law Constant

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► *Dermal: Outside*

Interior/Exterior Soil & Dust

Sediment & Surface Water

Potable & Non-Potable Groundwater Uses – Not Relevant
(D/F – NLL through soil to groundwater as noted in the Part 201 Criteria Tables)

6. Agricultural (Receptors: Outdoor Worker – Resident Farmer & Family)

► *Ingestion: on the farm*

Interior/Exterior Soil & Dust (including plowing, etc.)

Homegrown Vegetables/Fruits (on & off farm)

Homegrown Meat, Dairy, Eggs (on & off farm)

Sediment & Surface Water

Wildlife/Fish

Potable & Non-Potable Groundwater Uses – Not Relevant
(D/F – NLL through soil to groundwater as noted in the Part 201 Criteria Tables)

► *Inhalation: on the farm*

Interior/Exterior Dust (including plowing, etc.)

Volatilization – Not Relevant for D/F based on Henry's Law Constant

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► *Dermal: on the farm*

Interior/ Exterior Soil & Dust (including plowing, etc.)

Sediment & Surface Water

Potable & Non-Potable Groundwater Uses – Not Relevant
(D/F – NLL through soil to groundwater as noted in the Part 201 Criteria Tables)

7. Recreational (Receptors: Various - Hunter, Fisherman, Participants in Water sports, Dog Walkers, Student Athletes – e.g., Soccer Fields and Cross Country)

► *Ingestion: Recreational*

Exterior Soil

Interior Soil/Dust (human & pet track-in)

Sediment & Surface Water

Wildlife/Fish

Potable & Non-Potable Groundwater Uses – Not Relevant
(D/F – NLL through soil to groundwater as noted in the Part 201 Criteria Tables)

► *Inhalation: Recreational*

Exterior Dust

Volatilization – Not Relevant for D/F based on Henry's Law Constant

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► *Dermal: Recreational*

Exterior Soil

Sediment & Surface Water

Potable & Non-Potable Groundwater Uses – Not Relevant
(D/F – NLL through soil to groundwater as noted in the Part 201 Criteria Tables)

8. Special Residential (Receptors: Native Americans, Other Cultural/Ethnic Groups)

► *Ingestion: Cultural*

Interior/Exterior Soil & Dust (walking/gathering/hunting)
Homegrown Vegetables/Fruits
Wild Edibles
Local Produce, Dairy, Eggs, Meat
Sediment & Surface Water (gathering/recreation)
Wildlife/Fish
Medicinal/Ceremonial
(e.g., *Four sacred foods: deer, corn, strawberry and wild rice*
Three Sisters-Ceremonial: Corn Beans Squash
Maple: sugar bush)

Potable & Non-Potable Groundwater Uses – Not Relevant
(D/F – NLL through soil to groundwater as noted in the Part 201 Criteria Tables)

► *Inhalation: Cultural*

Interior/Exterior Dust
Medicinal/Ceremonial (smoke)

Volatilization – Not Relevant for D/F based on Henry's Law Constant

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► *Dermal: Cultural*

Interior/Exterior Soil & Dust
Sediment & Surface Water
Animal/Plant Product Contact
Medicinal/Ceremonial
(e.g., smudging/purification: sweet grass, cedar sacred medicinal plants
traditional basket making: black ash
sweat lodge
clothing: animal skins, claws
crafts: drums, rattles, fans

Potable & Non-Potable Groundwater Uses – Not Relevant
(D/F – NLL through soil to groundwater as noted in the Part 201 Criteria Tables)

Other Source Considerations

1. Baseline Dietary Exposures

    - National Food Supply (Non-Dow)
    - Vegetables/Fruits
    - Produce, Dairy, Eggs, Meat

2. Breast Feeding (Dow/Non-Dow related)

Table 1. Tittabawassee River Floodplain Soils and Sediments - Potentially Affected Media, Human Exposure Pathways, Risk Criteria Evaluation and Exposure Data Needs for Dioxins and Furans

PART 201 LAND USE CATEGORY (exception of agricultural)	HUMAN RECEPTOR POPULATIONS		POTENTIALLY AFFECTED MEDIA[2]	EXPOSURE ROUTES: INGESTION – RELEVANT PATHWAY[3]	EXPOSURE ROUTES: INGESTION – APPLICABLE CRITERIA[4]	EXPOSURE ROUTES: INHALATION – RELEVANT PATHWAY[3]	EXPOSURE ROUTES: INHALATION – APPLICABLE CRITERIA[4]	EXPOSURE ROUTES: DERMAL – RELEVANT PATHWAY[3]	EXPOSURE ROUTES: DERMAL – APPLICABLE CRITERIA[4]	AVAILABILITY OF DATA: CURRENT STATUS	AVAILABILITY OF DATA: INFORMATION SOURCE(S)	DATA COLLECTION PRIORITIZATION (RI Phase)
Residential / Commercial I	Floodplain Residents	1	Interior / Exterior Soil & Dust[a,d]	Yes	Yes	Yes	Yes	Yes	Yes	Limited	Field measurements; Literature	2
		2	Local[f] Vegetables & Fruits[a]	Yes	Yes	No	No	No	No	Limited	Literature	2
		3	Local[f] Dairy, Meat, Egg[a]	Yes	Yes	No	No	No	No	Very limited	Literature	1
		4	Local[f] Fish[a]	Yes	Yes	No	No	No	No	Medium (Fish)	Literature; Modeling; Field measurements	1
		5	Local[f] Wildlife[a]	Yes	Yes	No	No	No	No	Limited (Game)	Literature; Modeling; Field measurements	1
		6	Local[f] Sediment[a]	Yes	Yes	No	No	Yes	Yes	Limited	Field measurements (Activity-based sampling)	3
		7	Local[f] Surface Water[a]	Yes	Yes	No	No	Yes	Yes	Limited	Field measurements (Activity-based sampling)	3
		8	Breast Milk[a,e]	Yes	Yes	No	No	No	No	Limited	Literature; Modeling	1
		9	Baseline Diet[e]	Yes	No	No	No	No	No	Limited	Literature	2
Industrial / Commercial II	Industrial Workers	10	Interior / Exterior Soil & Dust[d]	Yes	Yes	Yes	Yes	Yes	Yes	Limited	Field measurements; Literature	2
		11	Local[f] Vegetables & Fruits[c]	Yes	No	No	No	No	No	Limited	Literature	2
		12	Local[f] Dairy, Meat, Egg[c]	Yes	No	No	No	No	No	Very limited	Literature	1
		13	Local[f] Fish[c]	Yes	No	No	No	No	No	Medium (Fish)	Literature; Modeling; Field measurements	1
		14	Local[f] Wildlife[c]	Yes	No	No	No	No	No	Limited (Game)	Literature; Modeling; Field measurements	1
		15	Local[f] Sediment[c]	No	No	No	No	Yes	Yes	Limited	Field measurements (Activity-based sampling)	3
		16	Local[f] Surface Water[c]	No	No	No	No	Yes	Yes	Limited	Field measurements (Activity-based sampling)	3
		17	Breast Milk[a,e]	Yes	Yes	No	No	No	No	Limited	Literature; Modeling	1
		18	Baseline Diet[e]	Yes	No	No	No	No	No	Limited	Literature	2

Table 1. Tittabawassee River Floodplain Soils and Sediments - Potentially Affected Media, Human Exposure Pathways, Risk Criteria Evaluation and Exposure Data Needs for Dioxins and Furans

PART 201 LAND USE CATEGORY (exception of agricultural)	HUMAN RECEPTOR POPULATIONS		POTENTIALLY AFFECTED MEDIA[2]	EXPOSURE ROUTES						AVAILABILITY OF DATA		DATA COLLECTION PRIORITIZATION (RI Phase)
				INGESTION		*INHALATION*		*DERMAL*		CURRENT STATUS	INFORMATION SOURCE(S)	
				RELEVANT PATHWAY[3]	APPLICABLE CRITERIA[4]	RELEVANT PATHWAY[3]	APPLICABLE CRITERIA[4]	RELEVANT PATHWAY[3]	APPLICABLE CRITERIA[4]			
Commercial III	Outdoor Worker (Low Soil Intensive)	19	Interior / Exterior Soil & Dust[d]	Yes	Yes	Yes	Yes	Yes	Yes	Limited	Field measurements; Literature	2
		20	Local[f] Vegetables & Fruits[c]	Yes	No	No	No	No	No	Limited	Literature	2
		21	Local[f] Dairy, Meat, Egg[c]	Yes	No	No	No	No	No	Very limited	Literature	1
		22	Local[f] Fish[c]	Yes	No	No	No	No	No	Medium (Fish)	Literature; Modeling; Field measurements	1
		23	Local[f] Wildlife[c]	Yes	No	No	No	No	No	Limited (Game)	Literature; Modeling; Field measurements	1
		24	Local[f] Sediment[c]	No	No	No	No	Yes	Yes	Limited	Field measurements (Activity-based sampling)	3
		25	Local[f] Surface Water[c]	No	No	No	No	Yes	Yes	Limited	Field measurements (Activity-based sampling)	3
		26	Breast Milk[a,e]	Yes	Yes	No	No	No	No	Limited	Literature; Modeling	1
		27	Baseline Diet[e]	Yes	No	No	No	No	No	Limited	Literature	2
Commercial IV	Outdoor Worker (High Soil Intensive)	28	Interior / Exterior Soil & Dust[d]	Yes	Yes	Yes	Yes	Yes	Yes	Limited	Field measurements; Literature	2
		29	Local[f] Vegetables & Fruits[c]	Yes	No	No	No	No	No	Limited	Literature	2
		30	Local[f] Dairy, Meat, Egg[c]	Yes	No	No	No	No	No	Very limited	Literature	1
		31	Local[f] Fish[c]	Yes	No	No	No	No	No	Medium (Fish)	Literature; Modeling; Field measurements	1
		32	Local[f] Wildlife[c]	Yes	No	No	No	No	No	Limited (Game)	Literature; Modeling; Field measurements	1
		33	Local[f] Sediment[c]	No	No	No	No	Yes	Yes	Limited	Field measurements (Activity-based sampling)	3
		34	Local[f] Surface Water[c]	No	No	No	No	Yes	Yes	Limited	Field measurements (Activity-based sampling)	3
		35	Breast Milk[a,e]	Yes	Yes	No	No	No	No	Limited	Literature; Modeling	1
		36	Baseline Diet[e]	Yes	No	No	No	No	No	Limited	Literature	2

Table 1. Tittabawassee River Floodplain Soils and Sediments - Potentially Affected Media, Human Exposure Pathways, Risk Criteria Evaluation and Exposure Data Needs for Dioxins and Furans

				EXPOSURE ROUTES						AVAILABILITY OF DATA		
				INGESTION		*INHALATION*		*DERMAL*				
PART 201 LAND USE CATEGORY (exception of agricultural)	HUMAN RECEPTOR POPULATIONS		POTENTIALLY AFFECTED MEDIA[2]	RELEVANT PATHWAY[3]	APPLICABLE CRITERIA[4]	RELEVANT PATHWAY[3]	APPLICABLE CRITERIA[4]	RELEVANT PATHWAY[3]	APPLICABLE CRITERIA[4]	CURRENT STATUS	INFORMATION SOURCE(S)	DATA COLLECTION PRIORITIZATION (RI Phase)
Agricultural	Farmer & Family	37	Interior / Exterior Soil & Dust[a]	Yes	Yes	Yes	Yes	Yes	Yes	Limited	Field measurements; Literature	2
		38	Local[f] Vegetables & Fruits[a]	Yes	Yes	No	No	No	No	Limited	Literature	2
		39	Dairy, Meat, Egg[a]	Yes	Yes	No	No	No	No	Very limited	Literature	1
		40	Fish[a]	Yes	Yes	No	No	No	No	Medium (Fish)	Literature; Modeling; Field measurements	1
		41	Wildlife[a]	Yes	Yes	No	No	No	No	Limited (Game)	Literature; Modeling; Field measurements	1
		42	Sediment[a]	Yes	Yes	No	No	Yes	Yes	Limited	Field measurements (Activity-based sampling)	3
		43	Surface Water[a]	Yes	Yes	No	No	Yes	Yes	Limited	Field measurements (Activity-based sampling)	3
		44	Breast Milk[a,e]	Yes	Yes	No	No	No	No	Limited	Literature; Modeling	1
		45	Baseline Diet[e]	Yes	No	No	No	No	No	Limited	Literature	2
Recreational	Various (Hunting, Fishing, Water Sports, Student Athletics, etc.)	46	Exterior Soil & Dust	Yes	Yes	Yes	Yes	Yes	Yes	Limited	Field measurements; Literature	2
		47	Interior Soil & Dust	Yes	Yes	No	No	No	No	Limited	Field measurements; Literature	2
		48	Local[f] Fish	Yes	Yes	No	No	No	No	Medium (Fish)	Literature; Modeling; Field measurements	1
		49	Local[f] Wildlife	Yes	Yes	No	No	No	No	Limited (Game)	Literature; Modeling; Field measurements	1
		50	Local[f] Sediment	Yes	Yes	No	No	Yes	Yes	Limited	Field measurements (Activity-based sampling)	3
		51	Local[f] Surface Water	Yes	Yes	No	No	Yes	Yes	Limited	Field measurements (Activity-based sampling)	3
		52	Breast Milk[a,e]	Yes	Yes	No	No	No	No	Limited	Literature; Modeling	1
		53	Baseline Diet[e]	Yes	No	No	No	No	No	Limited	Literature	2

Table 1. Tittabawassee River Floodplain Soils and Sediments - Potentially Affected Media, Human Exposure Pathways, Risk Criteria Evaluation and Exposure Data Needs for Dioxins and Furans

PART 201 LAND USE CATEGORY (exception of agricultural)	HUMAN RECEPTOR POPULATIONS		POTENTIALLY AFFECTED MEDIA[2]	EXPOSURE ROUTES: INGESTION RELEVANT PATHWAY[3]	EXPOSURE ROUTES: INGESTION APPLICABLE CRITERIA[4]	EXPOSURE ROUTES: INHALATION RELEVANT PATHWAY[3]	EXPOSURE ROUTES: INHALATION APPLICABLE CRITERIA[4]	EXPOSURE ROUTES: DERMAL RELEVANT PATHWAY[3]	EXPOSURE ROUTES: DERMAL APPLICABLE CRITERIA[4]	AVAILABILITY OF DATA: CURRENT STATUS	AVAILABILITY OF DATA: INFORMATION SOURCE(S)	DATA COLLECTION PRIORITIZATION (RI Phase)
Special Residential	Native American or other cultural/ethnic group	54	Interior / Exterior Soil & Dust[a]	Yes	Yes	Yes	Yes	Yes	Yes	Limited	Field measurements; Literature	2
		55	Local[f] Vegetables & Fruits[a]	Yes	Yes	Yes	Yes	Yes	Yes	Limited	Literature	2
		56	Local[f] Dairy, Meat, Egg[a]	Yes	Yes	No	No	Yes	Yes	Very limited	Literature	1
		57	Local[f] Fish[a]	Yes	Yes	No	No	Yes	Yes	Medium (Fish)	Literature; Modeling; Field measurements	1
		58	Local[f] Wildlife[a]	Yes	Yes	No	No	Yes	Yes	Limited (Game)	Literature; Modeling; Field measurements	1
		59	Local[f] Sediment[a]	Yes	Yes	No	No	Yes	Yes	Limited	Field measurements (Activity-based sampling)	3
		60	Local[f] Surface Water[a]	Yes	Yes	No	No	Yes	Yes	Limited	Field measurements (Activity-based sampling)	3
		61	Breast Milk[a,e]	Yes	Yes	No	No	No	No	Limited	Literature; Modeling	1
		62	Baseline Diet[e]	Yes	No	No	No	No	No	Limited	Literature	2

[1] Baseline diet exposures to be considered during the human health risk assessment for each land use and receptor category.
[2] Groundwater is not an affected medium based on the Part 201 Rules Generic Criteria designation of "NLL" - not likely to leach.
[3] "Yes" in this column indicates the pathway is relevant or complete; "No" indicates the pathway is not relevant.
[4] "Yes" in this column indicates that risk-based criteria and/or risk estimation is applicable for the pathway; "No" indicates risk-based criteria are ***not*** applicable on this property for the pathway (i.e., off property source).
[a] Exposure to affected media is from on-property site related source(s) and off-property site related source(s).
[b] Exposure to affected media is from on-property site related source(s) only.
[c] Exposure to affected media is from off-property site related sources only.
[d] Off-property site related agricultural sources also considered.
[e] Non-site related sources.
[f] Local - source(s) from Area(s) of Concern as defined by the operating license.

Table 2. Midland Area Soils - Potentially Affected Media, Human Exposure Pathways, Risk Criteria Evaluation and Exposure Data Needs for Dioxins and Furans

PART 201 LAND USE CATEGORY (exception of agricultural)	HUMAN RECEPTOR POPULATIONS		POTENTIALLY AFFECTED MEDIA[2]	EXPOSURE ROUTES						AVAILABILITY OF EXPOSURE DATA (I.E., MEDIA-SPECIFIC CONCENTRATIONS)		DATA COLLECTION PRIORITIZATION (RI Phase)
				INGESTION		*INHALATION*		*DERMAL*				
				RELEVANT PATHWAY[3]	APPLICABLE CRITERIA[4]	RELEVANT PATHWAY[3]	APPLICABLE CRITERIA[4]	RELEVANT PATHWAY[3]	APPLICABLE CRITERIA[4]	CURRENT STATUS	INFORMATION SOURCE(S)	
Residential / Commercial I	Midland Residents	1	Interior / Exterior Soil & Dust[a]	Yes	Yes	Yes	Yes	Yes	Yes	Limited	Field measurements; Literature	1
		2	Local[f] Vegetables & Fruits[a]	Yes	Yes	No	No	No	No	Limited	Literature	2
		3	Local[f] Dairy, Meat, Egg[c]	Yes	No	No	No	No	No	Very limited	Literature	NA
		4	Local[f] Fish[c]	Yes	No	No	No	No	No	Medium (Fish)	Literature; Modeling; Field measurements	NA
		5	Local[f] Wildlife[c]	Yes	No	No	No	No	No	Limited (Game)	Literature; Modeling; Field measurements	NA
		6	Local[f] Sediment[c]	Yes	No	No	No	Yes	No	Limited	Field measurements (Activity-based sampling)	NA
		7	Local[f] Surface Water[c]	Yes	No	No	No	Yes	No	Limited	Field measurements (Activity-based sampling)	NA
		8	Breast Milk[a,e]	Yes	Yes	No	No	No	No	Limited	Literature; Modeling	1
		9	Baseline Diet[e]	Yes	No	No	No	No	No	Limited	Literature	2
Industrial / Commercial II	Industrial Workers	10	Interior / Exterior Soil & Dust[d]	Yes	Yes	Yes	Yes	Yes	Yes	Limited	Field measurements; Literature	1
		11	Local[f] Vegetables & Fruits[c]	Yes	No	No	No	No	No	Limited	Literature	2
		12	Local[f] Dairy, Meat, Egg[c]	Yes	No	No	No	No	No	Very limited	Literature	NA
		13	Local[f] Fish[c]	Yes	No	No	No	No	No	Medium (Fish)	Literature; Modeling; Field measurements	NA
		14	Local[f] Wildlife[c]	Yes	No	No	No	No	No	Limited (Game)	Literature; Modeling; Field measurements	NA
		15	Local[f] Sediment[c]	No	No	No	No	No	No	Limited	Field measurements (Activity-based sampling)	NA
		16	Local[f] Surface Water[c]	No	No	No	No	No	No	Limited	Field measurements (Activity-based sampling)	NA
		17	Breast Milk[a,e]	Yes	Yes	No	No	No	No	Limited	Literature; Modeling	1
		18	Baseline Diet[e]	Yes	No	No	No	No	No	Limited	Literature	2

Table 2. Midland Area Soils - Potentially Affected Media, Human Exposure Pathways, Risk Criteria Evaluation and Exposure Data Needs for Dioxins and Furans

PART 201 LAND USE CATEGORY (exception of agricultural)	HUMAN RECEPTOR POPULATIONS		POTENTIALLY AFFECTED MEDIA[2]	EXPOSURE ROUTES						AVAILABILITY OF EXPOSURE DATA (I.E., MEDIA-SPECIFIC CONCENTRATIONS)		DATA COLLECTION PRIORITIZATION (RI Phase)
				INGESTION		*INHALATION*		*DERMAL*				
				RELEVANT PATHWAY[3]	APPLICABLE CRITERIA[4]	RELEVANT PATHWAY[3]	APPLICABLE CRITERIA[4]	RELEVANT PATHWAY[3]	APPLICABLE CRITERIA[4]	CURRENT STATUS	INFORMATION SOURCE(S)	
Commercial III	Outdoor Worker (Low Soil Intensive)	19	Interior / Exterior Soil & Dust[d]	Yes	Yes	Yes	Yes	Yes	Yes	Limited	Field measurements; Literature	1
		20	Local[f] Vegetables & Fruits[c]	Yes	No	No	No	No	No	Limited	Literature	2
		21	Local[f] Dairy, Meat, Egg[c]	Yes	No	No	No	No	No	Very limited	Literature	NA
		22	Local[f] Fish[c]	Yes	No	No	No	No	No	Medium (Fish)	Literature; Modeling; Field measurements	NA
		23	Local[f] Wildlife[c]	Yes	No	No	No	No	No	Limited (Game)	Literature; Modeling; Field measurements	NA
		24	Local[f] Sediment[c]	No	No	No	No	No	No	Limited	Field measurements (Activity-based sampling)	NA
		25	Local[f] Surface Water[c]	No	No	No	No	No	No	Limited	Field measurements (Activity-based sampling)	NA
		26	Breast Milk[a,e]	Yes	Yes	No	No	No	No	Limited	Literature; Modeling	1
		27	Baseline Diet[e]	Yes	No	No	No	No	No	Limited	Literature	2
Commercial IV	Outdoor Worker (High Soil Intensive)	28	Interior / Exterior Soil & Dust[d]	Yes	Yes	Yes	Yes	Yes	Yes	Limited	Field measurements; Literature	1
		29	Local[f] Vegetables & Fruits[c]	Yes	No	No	No	No	No	Limited	Literature	2
		30	Local[f] Dairy, Meat, Egg[c]	Yes	No	No	No	No	No	Very limited	Literature	NA
		31	Local[f] Fish[c]	Yes	No	No	No	No	No	Medium (Fish)	Literature; Modeling; Field measurements	NA
		32	Local[f] Wildlife[c]	Yes	No	No	No	No	No	Limited (Game)	Literature; Modeling; Field measurements	NA
		33	Local[f] Sediment[c]	No	No	No	No	No	No	Limited	Field measurements (Activity-based sampling)	NA
		34	Local[f] Surface Water[c]	No	No	No	No	No	No	Limited	Field measurements (Activity-based sampling)	NA
		35	Breast Milk[a,e]	Yes	Yes	No	No	No	No	Limited	Literature; Modeling	1
		36	Baseline Diet[e]	Yes	No	No	No	No	No	Limited	Literature	2

Table 2. Midland Area Soils - Potentially Affected Media, Human Exposure Pathways, Risk Criteria Evaluation and Exposure Data Needs for Dioxins and Furans

				EXPOSURE ROUTES						AVAILABILITY OF EXPOSURE DATA (I.E., MEDIA-SPECIFIC CONCENTRATIONS)		
				INGESTION		*INHALATION*		*DERMAL*				
PART 201 LAND USE CATEGORY (exception of agricultural)	**HUMAN RECEPTOR POPULATIONS**		**POTENTIALLY AFFECTED MEDIA[2]**	**RELEVANT PATHWAY[3]**	**APPLICABLE CRITERIA[4]**	**RELEVANT PATHWAY[3]**	**APPLICABLE CRITERIA[4]**	**RELEVANT PATHWAY[3]**	**APPLICABLE CRITERIA[4]**	**CURRENT STATUS**	**INFORMATION SOURCE(S)**	DATA COLLECTION PRIORITIZATION (RI Phase)
Recreational	Various (Hunting, Fishing, Water Sports, Student Athletics, etc.)	37	Exterior Soil & Dust	Yes	Yes	Yes	Yes	Yes	Yes	Limited	Field measurements; Literature	1
		38	Interior Soil & Dust	Yes	Yes	No	No	No	No	Limited	Field measurements; Literature	1

[1] Baseline diet exposures to be considered during the human health risk assessment for each land use and receptor category.
[2] Groundwater is not an affected medium based on the Part 201 Rules Generic Criteria designation of "NLL" - not likely to leach.
[3] "Yes" in this column indicates the pathway is relevant or complete; "No" indicates the pathway is not relevant.
[4] "Yes" in this column indicates that risk-based criteria and/or risk estimation is applicable for the pathway; "No" indicates risk-based criteria are ***not*** applicable on this property for the pathway (i.e., off property source).
[a] Exposure to affected media is from on-property site related source(s) and off-property site related source(s).
[b] Exposure to affected media is from on-property site related source(s) only.
[c] Exposure to affected media is from off-property site related sources only.
[d] Off-property site related agricultural sources also considered.
[e] Non-site related sources.
[f] Local - source(s) from Area(s) of Concern as defined by the operating license.
NA - Media and pathway risk is not applicable to the offsite Midland Area Soils study area.

ATTACHMENT 4

City of Midland, Public Comments, and Michigan Department of Environmental Quality Responses/Notice of Deficiency (NOD) on The Dow Chemical Company (Dow) Midland Area Soils Remedial Investigation Work Plan (Midland RIWP)

April 13, 2006

The comments are shown in *italic font*. The MDEQ's responses to comments/deficiencies are shown in **bold font**. The "[5/1/06]" at the end of the MDEQ's response means this deficiency is to be addressed in the submittal due on May 1, 2006. The "[12/1/06]" at the end of the MDEQ's response means this deficiency is to be addressed in the submittal due on December 1, 2006. No date in brackets following the MDEQ's response denotes public comments/other information that is to be taken into account by Dow in revising the TR RIWP and/or Midland RIWP.

City of Midland's Comments

1. *We are writing to you on behalf of the City of Midland. The City hopes that the Michigan Department of Environmental Quality (MDEQ) will take into consideration the following comments regarding the Midland Area Soils Remedial Investigation Work Plan (RIWP) for the Dow Off-Site Corrective Action. Each of the following comments relate to the effect the RIWP will have on private property owners in Midland. The City has a critical interest in the substance and form of the RIWP, not only because it owns property affected by this RIWP, but because Dow's conduct under the RIWP has the potential to affect all Midland citizens.*

   Both MDEQ and the United States Environmental Protection Agency (EPA) have indicated that Dow's proposed draft of the RIWP is unacceptable and must be resubmitted with substantial revisions. Accordingly, these comments focus on the elements the City views as essential to a well-designed RIWP and not to specific provisions in the current draft, which are likely to change before being approved.

The MDEQ acknowledges these comments.

2. *Access To Private Property*

   (a) Access to private property should be dictated by voluntary cooperation from property owners.

   (b) *When seeking access, Dow should be required to provide a neutral and legally accurate explanation of the rights/duties of property owners regarding access without any undue pressure designed to gain access.*

With respect to comments 2.(a) and 2.(b), the MDEQ notes that Dow has an obligation under R 299.9629(2) to use "best efforts" to gain property access for the purposes of conducting corrective action. The MDEQ agrees that potentially impacted non-Dow property owner participation in the corrective action investigation activities should be voluntary to the greatest extent practicable. Under state law, if Dow fails to gain access despite their best efforts, Dow would still be liable for corrective action at the property.

The MDEQ does not believe it is necessary to modify the Midland RIWP to specifically address these comments as Dow is required by state law to use "best efforts" to obtain property access.

(c) At a minimum, this explanation of the rights and duties associated with access should inform the property owner of:

(i) what will occur during sampling, such as the movement of equipment onto the property;

(ii) the times sampling will occur;

(iii) who will be present while sampling occurs;

(iv) the potential contaminants of interest (PCOIs) for which the samples will be tested;

(v) the various studies in which any samples taken would be used;

(vi) steps taken to obscure the identity of the property when testing the samples;

(vii) how long samples will be retained;

(viii) the steps that will occur if the property is determined to have soils that meet or exceed generic cleanup criteria, site-specific criteria, or action levels for PCOIs;

(ix) any inferences regarding facility status and due care responsibilities to be drawn from allowing sampling and testing;

(x) how the test results will be disclosed;

(xi) Dow's obligation to restore the property to its original (or better) condition following sampling.

(d) Dow should be required to use the least intrusive methods of access tailored to the individual property owners' respective circumstances. These methods should take into consideration the time of day for access, locating points of access from public roads rather than neighboring parcels, efforts to avoid disturbing gardens and planting, and other factors.

The MDEQ concurs that the elements listed in comments 2.(c) and 2.(d) are important components of the property access agreements that are to be negotiated between Dow and the property owner(s). The MDEQ would consider offering to include these elements as conditions of a property access agreement as part of the "best efforts" that Dow needs to conduct in order to gain property access for corrective action purposes.

With respect to comment 2.(c)(iv), the MDEQ would support more flexibility in the conditions of the property access agreement in order to ensure that additional compounds that may not have been specifically listed on the original access agreement can be identified, if necessary. For example, a library search for compounds present in the soil sample may identify an important compound that was not included on the original target analyte list or additional information that is developed later in the corrective action process may identify a compound that could be an important risk driver that was not on the original list.

Further, with respect to comment 2.(c)(v), at this point in the corrective action process, Dow and the MDEQ may not be able to accurately predict all of the studies in which the collected data could potentially be used. It is possible that the nature and types of studies may change as the corrective action process moves forward.

The MDEQ does not believe it is necessary to revise the Midland RIWP to specifically address these comments, as Dow is required to use "best efforts" by regulation to obtain property access. The MDEQ would consider the elements listed above, as further discussed in the MDEQ response, to be part of a suite of "reasonable best efforts" that Dow would offer to property owners to gain property access.

3. *Soil Sampling*

(a) *Avoiding unnecessary and duplicative sampling should be a cornerstone of any sampling plan.*

The MDEQ acknowledges and agrees with this comment. The MDEQ does not believe it is necessary to modify the Midland RIWP to specifically address this comment.

(b) *Dow and MDEQ should agree regarding all PCOIs subject to testing in advance of off-site sampling so that only one entry on to private property for sampling is necessary.*

(c) *Dow should be required to gather sufficient samples for all approved testing during a single entry onto private property, even if the testing will be conducted under multiple, separate work plans.*

The MDEQ acknowledges and agrees with comments 3.(b) and (c) to the extent that this concept is practicable. For example, in some cases it may be necessary to visit a property more than once to obtain additional sample volume (e.g., bioavailability study) or for other reasons described in response to previous comments on "Access to Private Property." The MDEQ does not believe it is necessary to modify the Midland RIWP to specifically address this comment.

(d) *Dow and MDEQ should agree to an objective protocol that will determine when sampling in a particular area should stop, e.g., when there is sufficient data to determine nature and extent, sampling will stop at that boundary even if additional properties were slated for sampling.*

The MDEQ acknowledges and agrees with this comment. The revised Midland RIWP must specifically address and respond to this comment. [5/1/06]

(e) *Dow and MDEQ should agree on a trusted third party to assign identification numbers to soil samples so that further laboratory, Dow, and MDEQ handling is done on an anonymous basis without knowledge of the specific property where the sample was collected.*

The MDEQ acknowledges this comment. In order to make forward progress on this issue, Dow and the MDEQ have made the commitment to the city of Midland to conduct the initial RIWP investigations in Midland in a manner where sample concentrations are not associated with specific properties unless concentrations of contaminants are found that require more immediate action. The revised Midland RIWP must specifically address and respond to this comment. [5/1/06]

(f) *The sampling plan should specify in advance how long samples must be retained and after what time they will be discarded in an appropriate manner.*

The MDEQ acknowledges and agrees with this comment. The revised Midland RIWP must specifically address and respond to this comment. [5/1/06]

(g) *Midland supports developing a sampling protocol that will prevent attaching a facility designation to any private property before site-specific cleanup criteria (SSCC) are approved for all PCOIs. This protocol may rely, for instance, on standardized methodology for selecting property to sample, using anonymous identification numbers for samples, and segregating that identification information from test results until the SSCC are developed.*

The development of site-specific cleanup criteria is not necessary for all cleanup criteria for all PCOIs. For PCOIs without cleanup criteria or with cleanup criteria based on outdated toxicity information, it is appropriate and may be necessary to spend time developing new generic or site-specific cleanup criteria. If Dow demonstrates that there are site-specific differences in exposures related to a PCOI, as compared to those used for the generic criteria (e.g., bioavailability), it may be appropriate to develop site-specific criteria. However, reevaluation and/or redevelopment of criteria for all PCOIs is not the best use of time and resources and is not likely to result in response activity being completed in a reasonable period of time. The MDEQ does not believe it is necessary or appropriate to modify the Midland RIWP to address this comment with respect to the development of site-specific cleanup criteria.

As noted above, Dow and the MDEQ have made the commitment to the city of Midland to conduct the initial RIWP investigations in Midland in a manner where sample concentrations are not associated with specific properties unless concentrations of contaminants are found that require more immediate action. The revised Midland RIWP must specifically address and respond to this portion of the comment. [5/1/06]

(h) *Dow must be required to restore property to its original (or better) condition following sampling.*

The MDEQ acknowledges and agrees with this comment. The MDEQ does not believe it is necessary to modify the Midland RIWP to specifically address this comment as Dow is required to use "best efforts" by regulation to obtain property access. The MDEQ would consider this basic concept to be part of a suite of "reasonable best efforts" that Dow would offer to property owners to gain property access.

4. *Soil Testing*

(a) *The fundamental basis for any testing plan should be developing quality assurance methods that will generate confidence in results by Dow, MDEQ, and the public and will prevent the need to repeat sampling and testing.*

The MDEQ acknowledges and agrees with this comment. The revised Midland RIWP must be developed in a manner that specifically addresses and responds to this comment to the extent practicable (as previously discussed). [5/1/06]

(b) *All testing should be truly blind so that neither MDEQ nor Dow know which test results belong to a specific parcel of property unless results indicate that the soils meet an action level.*

The MDEQ acknowledges and agrees with this comment with the clarification that "action level" in this context means a level which triggers the implementation of interim response activities. At a point in the future, it may be necessary to "unblind" the sample locations so

that final response activities can be implemented. The revised Midland RIWP must be developed in a manner that specifically addresses and responds to this comment. [5/1/06]

(c) Even if test results reveal that soils exceed the generic residential cleanup criteria, they should not be used as action levels during the remedial investigation.

Some generic residential cleanup criteria are based on short-term or acute effects and, therefore, must be used for determining the need for interim response activities. An example of a criterion based on an acute effect is the soil direct contact criterion for cyanide. The soil direct contact criterion for cyanide has been developed to prevent death for a child that may ingest a relatively large amount of soil in a short time (e.g., pica behavior). An additional example includes developmental toxicants that can result in adverse impacts after a single exposure during a critical window of development. Several chemicals have criteria based on developmental exposure and effects. There are other criteria based on short-term exposures. In these cases, generic cleanup criteria are appropriate as action levels during the remedial investigation.

The MDEQ does not believe it is necessary or appropriate to modify the Midland RIWP to address this comment with respect to the development of site-specific cleanup criteria.

(d) The action level for dioxins and furans should be no lower than 1,000 ppt.

The MDEQ has agreed to use the Agency for Toxic Substances and Disease Registry (ATSDR) interim policy guidance soil action level of 1,000 parts per trillion (ppt) level for interim response activities, unless new information becomes available that indicates additional interim response activities are necessary. As specified in Section I.B.4. of the Framework for an Agreement, "DEQ will not require further interim action by Dow before January 2006 unless new information becomes available that indicates further immediate actions in advance of a remedial action plan must be taken to protect human health or the environment. Dow always has the flexibility to voluntarily implement IRAs other than Priority 1 IRAs at any time."

The MDEQ does not believe it is necessary or appropriate to modify the Midland RIWP to address this comment with respect to the development of site-specific cleanup criteria.

(e) MDEQ and Dow, with concurrence from Midland, should agree to action levels for other PCOI's that are a multiplier of the generic residential cleanup criteria.

A multiplier across all chemical criteria has no scientific basis. The MDEQ is committed to using the best available science for the protection of public health, safety, and welfare. While it is true that some chemicals (e.g., dioxins and furans, polychlorinated biphenyls, and DDT) require much lower concentrations to protect against affects that are a result of chronic exposure (e.g., some types of cancer or cardiovascular diseases) than would be necessary for short-term (i.e., less than seven years) exposures, many chemicals do not. Some chemicals have an equivalent or greater hazard for short-term exposures. Some chemicals even have cleanup criteria based on short-term or acute hazards. An example of this is cyanide. The soil direct contact criterion for cyanide has been developed to prevent death for a child that may ingest a relatively large amount of soil in a very short period of time (e.g., pica behavior), which was not adequately protected for based on chronic exposure. Several chemicals have criteria based on developmental exposure. Many developmental toxicants can result in adverse impacts after a single exposure during a critical window of

development. For these reasons, it is not appropriate to set an arbitrary multiplier for interim response activities.

As previously communicated to Dow by e-mail from Mr. George W. Bruchmann, Chief, WHMD, on December 12, 2005, in the Midland Representative Soil Sampling and Analysis Plan in Support of Bioavailability Study, Dow must use the lowest level of the following for identifying whether blinded sample results need to be further evaluated for interim response activity:

1) **Soil value based on intermediate exposure periods (e.g., an ATSDR intermediate [14-365 days exposure duration] Environmental Media Evaluation Guides, value derived from an ATSDR intermediate Minimum Risk Level and/or using U.S. EPA subchronic reference doses [2 weeks to 7 years]);**

2) **Soil criterion or value based on acute exposure (less than 14 days);**

3) **Soil criterion or value based on developmental exposures and effects when available and more stringent than the arbitrary proposal of 10 times the generic residential cleanup criteria.**

5. *Disclosing Test Results*

(a) *No property owner should be required to receive test results against their wishes unless test results meet or exceed a predetermined action level for one or more PCOIs.*

The MDEQ concurs with this comment to the extent that it applies to the period of time prior to the development of the site-specific cleanup criteria for dioxins and furans. After development of the site-specific cleanup criteria, the property owners will need to be informed of their results if they exceed the site-specific cleanup criteria or other applicable criteria.

The MDEQ does not believe it is necessary to revise the Midland RIWP to specifically address this comment at this time. However, if site-specific cleanup criteria are developed in the future, the Midland RIWP will need to be revised to specifically identify the criteria and timeframes for disclosing sampling data to property owners, Dow, and the MDEQ.

(b) *Property owners should be permitted to request information on a voluntary basis from the trusted third party regarding whether the samples taken were tested and, if so, the results for all PCOIs even when the results do not meet action levels.*

The MDEQ acknowledges and agrees with this comment. The revised Midland RIWP must be developed in a manner that specifically addresses and responds to this comment. [5/1/06]

(c) *MDEQ and Dow should not be informed of the identity of any property owners who voluntarily seek test results from the trusted third party.*

The MDEQ acknowledges and agrees with this comment. The revised Midland RIWP must be developed in a manner that specifically addresses and responds to this comment. [5/1/06]

(d) *MDEQ and Dow should not have access to test results for particular parcels of property that fall below action levels until after the SSCC are developed.*

The MDEQ concurs with this comment to the extent that it applies to the period of time prior to the development of the site-specific cleanup criteria for dioxins and furans. After development of the site-specific cleanup criteria, the property owners will need to be informed of their results if they exceed the site-specific cleanup criteria or other applicable criteria.

The MDEQ does not believe it is necessary to revise the Midland RIWP to specifically address this comment at this time. However, if site-specific cleanup criteria are developed in the future, the RIWP will need to be revised to specifically identify the criteria and timeframes for disclosing sampling data to property owners, Dow, and the MDEQ.

6. *Other*

(a) *MDEQ should develop a written policy statement establishing that there is no inference regarding facility status simply because a property owner permits sampling.*

This comment requires no response from Dow in the revision of the Midland RIWP. This statement has been addressed in the "Frequently Asked Questions for Owners of Property Affected by Migrating Dioxin Contamination – Revised Supplemental Advisory" document developed by the MDEQ. This document is available at www.michigan.gov/deqdioxin.

(b) *MDEQ should develop a written policy statement establishing that there is no inference regarding facility status simply because samples taken from a property are selected for and subject to testing for one or more PCOIs.*

This comment requires no response from Dow in the revision of the Midland RIWP. This statement has been addressed in the "Frequently Asked Questions for Owners of Property Affected by Migrating Dioxin Contamination – Revised Supplemental Advisory" document developed by the MDEQ. This document is available at www.michigan.gov/deqdioxin. Note that the Midland "Priority 1" neighborhood, where sampling is likely to occur during the Midland RIWP, already has "facility" status because they are being addressed by interim response activities.

(c) *MDEQ should make a clear statement in writing to property owners regarding due care obligations if testing reveals PCOIs that meet action levels or property falls within the boundaries of contamination.*

This comment requires no response from Dow in the revision of the Midland RIWP. This statement has been addressed in the "Frequently Asked Questions for Owners of Property Affected by Migrating Dioxin Contamination – Revised Supplemental Advisory" document developed by the MDEQ. This document is available at www.michigan.gov/deqdioxin.

(d) *Dow must be required to pay for all remediation, whether taken as an interim or final response activity.*

The MDEQ acknowledges and agrees with this comment to the extent that the remediation is necessary because of releases from Dow. The MDEQ does not believe it is necessary to revise the Midland RIWP to specifically address this comment as this concept and requirement is inherent in the state and federal corrective action regulations.

7. *Dow must be required to confirm the effectiveness of its remedial activities with additional sampling and testing that would also be used to demonstrate that the property is no longer a facility.*

The MDEQ acknowledges and concurs with this comment. The revised Midland RIWP must be developed in a manner that specifically addresses and responds to this comment. [12/1/06]

8. *Midland hopes that MDEQ will seriously consider these comments when reviewing Dow's RIWP. Midland looks forward to an opportunity to review and provide additional comments regarding future drafts of the Midland Area Soils RIWP, as well as other plans and submissions.*

As documented in this attachment, the MDEQ has seriously considered the city of Midland's comments as part of its review of the Midland RIWP. The MDEQ expects to afford opportunities for further review and comment on future drafts of the Midland RIWP and related submittals by Dow.

<u>Comments from Other Public Commenters</u>

9. *Midland HHRAWP Comments*

   Section 4, page 4-2, states that "Data from scientific literature will be reviewed for specific exposure variables and may be ... to represent the exposure pathway and site-specific characteristics." This seems to imply that Dow is exploring information unknown to itself. Rather than "breaking new ground", it is recommended that information already known to the MDEQ, MDCH and the EPA be used to guide Dow.

Although there are established algorithms and exposure variables under Part 201, the MDEQ will consider information relevant to exposure assessment for a specific site that better represents current and foreseeable future use for that site. In some circumstances, exposure pathways without established algorithms and exposure variables must be evaluated (e.g., food chain contamination pursuant to R 299.5728; sediment contamination pursuant to R 299.5730). These circumstances may require a review of the U.S. EPA's guidance, other agency's guidance and/or other scientific literature to determine the most appropriate algorithm(s) and exposure variables to ensure adequate protection of public health, safety, welfare, and the environment.

The MDEQ does not believe it is necessary to modify the Midland RIWP to specifically address this comment, as Dow is required to comply with the Part 201 requirements for developing site-specific cleanup criteria.

10. *Section 4, page 4-2, states that "Work plans for these studies will be developed and shared with the MDEQ when it is determined that the study is needed." The MI-HHRAWP should have already provided any such work plans, if the MI-HHRAWP did not do so, then the MI-HHRAWP is deficient and should be viewed as yet another delay tactic by Dow. In addition, the MDEQ has the authority to approve work plans. The use of the word "share" is inappropriate.*

The MDEQ concurs that any and all work plans that are part of the Midland HHRA WP must be submitted to the MDEQ for review and approval as stated in Deficiency 12 in Attachment A of the March 2, 2006, NOD.

In addition to responding to Deficiency 12, the phasing of the Midland HHRA WP must be laid out in a schedule for adequate planning purposes for the MDEQ and ISAP review. Since the Midland HHRA WP is part of the Midland RIWP, any anticipated subsequent phases must be adequately described to determine if the phase being proposed is appropriately defined; the phase being proposed complies with the requirements it is intended to address; and the phasing will not prevent the remedial investigation from being completed in a timely fashion (R 299.5728(2)). This additional detail is intended to clarify the intent of Deficiencies 1, 2, and 26 in Attachment A, as well as Comment 14 in Attachment B of the March 2, 2006, NOD, with respect to the Midland HHRA WP. [12/1/06]

11. *General Comment: It has been determined that residences in Nitro, WV have D/F levels in the attics and ceiling spaces that are much higher than those found in the soils surrounding the homes. The dioxin source is from incinerator air deposition. It is recommended that this pathway of exposure be added to those that will be evaluated as part of the MI-HHRA.*

The MDEQ acknowledges this comment and directs Dow to evaluate this potential exposure pathway and to address this comment in the Midland HHRA WP. [12/1/06]

12. *General Comment: Comments made on the TR-HHRAWP are incorporated by reference with the understanding that Section numbers are different.*

The MDEQ's responses to the TR HHRA WP comments contained in Comments 3.(a)-(g) in Attachment 3 of this NOD are applicable to the Midland HHRA WP, as described therein.

13. *Midland Area Soils Remedial Investigation Work Plan*

The company indicated that 140 locations in Midland have already been sampled for dioxins between 1984 and 1998 and that another 90 locations would be sampled in the future. Section 4.2.2.2 of the RIWP indicates that the additional 90 sampling locations will demonstrate that the probability of mistakenly excluding a contaminated target is less than 5 percent. Restated, there is a 95% probability that a target contaminate will be located by the 90 samples. This information is in contradiction to the sampling protocol used by the US EPA at Love Canal in Niagara Falls, NY.

In order to assure that all areas of chemical contamination greater than an area of approximately 160 ft by 120 ft, or about the size of a typical Love Canal residential property, were known to a 95% confidence level, EPA sampled 2,200 locations in the 78 acres or about 28 locations per acre.

There is a discrepancy between the sampling that the EPA did at Love Canal and the sampling the company is proposing at Midland. EPA sampled 2,200 locations in 78 acres to achieve a 95% confidence level while Dow is proposing that 90 locations in nearly 15,000 acres is sufficient to achieve the same 95% confidence level.

The MAS-RIWP sampling plan was vague on the depth of the soils that would be sampled at the proposed 90 locations. Section 4.2.3.2 indicated that Phase II of the Remedial Investigation would sample soils in 6 inch layers from the surface to a depth of three feet. However, only 18 locations would be sampled to determine the extent of vertical dioxin contamination. Eighteen (18) locations in 15,000 acres is insufficient to provide the Midland residents the same 95% confidence level that was provided Love Canal residents.

Dow has been incinerating chemical wastes and emitting high levels of dioxins into the community for approximately 70 years. In those seventy years, a great deal of construction and landscaping has occurred in Midland. It is certain that dioxins have been moved and relocated from their initial location to other locations. Sampling surface soils in 90 locations and deeper soils in 18 locations will not provide Midland residents with sufficient information to provide guidance on the potential exposure that might occur as they plant their gardens or allow their children to play in a public park.

The total number of locations that should be sampled must be increased dramatically. Dow's proposed sampling will supposedly provide information on dioxin levels from the company's fence line to a distance approximately 4 miles from their incinerator complex. It is recommended that neighborhoods and public area that are within 2 miles of the incinerators be heavily sampled and the sampling density used at the Love Canal – 28 locations per acre – should be required rather than the 6/1000 of a sample per acre being proposed by the company.

The MDEQ concurs that substantial revisions are necessary to provide the level of information necessary to make remedial decisions. As noted in the March 2, 2006, NOD, a much clearer explanation of the proposed phases of work needs to be provided in the revised Midland RIWP in order for the MDEQ to conduct an informed review of the Midland RIWP (as well as the TR RIWP). It is acknowledged that a substantially higher sampling density than has been proposed by Dow in the Midland RIWP is typically required to make remedial decisions. These comments on sampling density will be reconsidered during the review of the revised Midland RIWP. [5/1/06]

14. *The MAS-RIWP only addresses soil sampling and does not propose any sampling of residences. The West Virginia DEQ has been provided information that dioxin levels in the attics of homes in Nitro, WV are substantially higher than the dioxin levels found in the soils of the properties. It is recommended that the MAS-RIWP be expanded to determine dioxin levels in both soils and inside all residences of the Priority One neighborhoods. Dow was free to ask resident if they would like their soils/dust tested on the Priority One residences in the T-floodplain, but chose not to. Soils and dust testing should not be optional by Dow for Midland Priority One properties.*

The MDEQ acknowledges and agrees with this comment. The revised Midland RIWP must be developed in a manner that specifically addresses and responds to this comment. [5/1/06]

15. *Dow's proposed sampling of Midland area soils is based on the assumption that all of the incineration of chemical wastes occurred at the present incinerator complex. The proposed sampling grid uses the present day incinerator complex as a center.*

It was well known that the company also incinerated chemical wastes in its powerhouses beginning in the 1960's and may have continued this type of waste burning for more than 10 years. Based on information supplied by the company, it is possible that more than 25 percent of the chemical waste tars that the company incinerated in 1968 may have been incinerated in the powerhouses.

Very high levels of dioxins have been found adjacent to the Wexford Avenue Priority 1 Area. Wexford Avenue is much closer to the NT Powerhouse than it is to the company's incineration complex. The incineration of chemical wastes in the NT Powerhouse may be the reason for the high dioxin levels in this neighborhood.

In addition, the older portions of Midland are much closer to the NT Powerhouse than to the incinerator complex and very few locations in the older portions of the city have been sampled

for dioxins. It is recommended that the company be required to provide additional information on the incineration of chemical wastes in its powerhouses and to amend its proposed sampling plan to include a determination of the effects of the incineration of chemical wastes in the NT Powerhouse.

The MDEQ acknowledges and agrees with these comments. The revised Midland RIWP must be developed in a manner that specifically addresses and responds to these comments. [5/1/06]

16. *The proposed MAS-RIWP failed to address potential migration of hazardous waste from the east side of the Midland plant under South Saginaw Road potentially in the direction of the Corning Lane Priority One Area and towards the homes north of Mark Putnam and Schuette Roads.*

    The licensee operated a large chemical waste pond in the area between the C & O railroad tracks and South Saginaw Road. A waste pond closest to Saginaw Road about 75 acres in size was used to store general organic wastes – such as chlorinated benzenes – until the pond was drained to the river in the summertime. It is well recognized that chlorinated benzenes are the precursors to a variety of dioxins and furans. It is highly probable that the tars at the bottom of the pond contained high levels of dioxins.

    Excavations that are done in the area to repair underground utility lines and sewers often encounter layers of black, viscous tars that were the bottom of the pond. On page 2-18 of the TR-RIWP, the company indicated that it installed a groundwater interceptor system "in 2002 along South Saginaw Road." This would suggest that leachate from the chemical waste pond may be flowing in an easterly direction from the plant. It has been reported that the DEQ has been provided very little information about the extent of the underground contamination in this part of the plant. It is somewhat doubtful that the company would have installed an expensive groundwater interceptor system without good reason.

    The S. Saginaw chemical waste pond was in operation in the 1930's and the company installed the collection system in 2002. Seventy years is ample time for contaminated groundwater to migrate a long distance – perhaps underneath the homes around Corning Lane. The MAS-RIWP should be amended to determine if hazardous wastes have migrated off-site from this historic chemical waste pond.

    The DEQ has previously cited the licensee for failure to comply with reporting requirements under Part II.L.6. It is recommended that the DEQ use its authority to obtain any and all environmental monitoring performed by the licensee on the S. Saginaw waste pond, groundwater contamination and composition of leachate being collected in the S. Saginaw Revetment and Collection system. This information will help guide the DEQ is determining the extent of additional sampling and analysis.

    It should be noted that the company failed to include the closed chemical waste pond west of Saginaw Road in its Hazardous Waste Operating License. The company did notify the DEQ about both the closed Ash and Cooling Water Ponds that were formed when the large Saginaw Road waste pond was partially closed. The company included these two ponds in the operating license but not areas currently used as the location for various manufacturing, warehousing and personnel facilities.

The MDEQ acknowledges these comments and agrees that additional investigation is necessary to address the presence of the noted historic chemical waste ponds and groundwater that has been impacted by historic Dow operations. It should also be noted that

these issues are being addressed as part of Dow's "on-site" corrective action program, which contains specific requirements to evaluate groundwater at the perimeter of the Dow facility and to investigate the noted historic pond. If these "on-site" investigations indicate that contaminated groundwater has or may have migrated off-site, additional off-site groundwater sampling will be conducted. Dow must consider the above comments in the revision of the Midland RIWP. [12/1/06]

17. *The MAS-RIWP failed to address the potential for migration of hazardous waste from two of the company's Chemical Disposal .As the DEQ is aware, there was extensive oil and gas well exploration in Midland County and that many of the "dry wells" were not properly sealed to prevent contamination between formations. RIWP for Midland must be amended to include a determination that private property has not been contaminated by chemical disposal well wastes.*

The MDEQ acknowledges these comments and agrees that additional investigation is necessary to address the presence of former chemical waste disposal wells. Potential releases from on-site chemical waste disposal ponds are being addressed as part of the on-site corrective action process. Dow must consider the above comments in the revision of the Midland RIWP. [12/1/06]